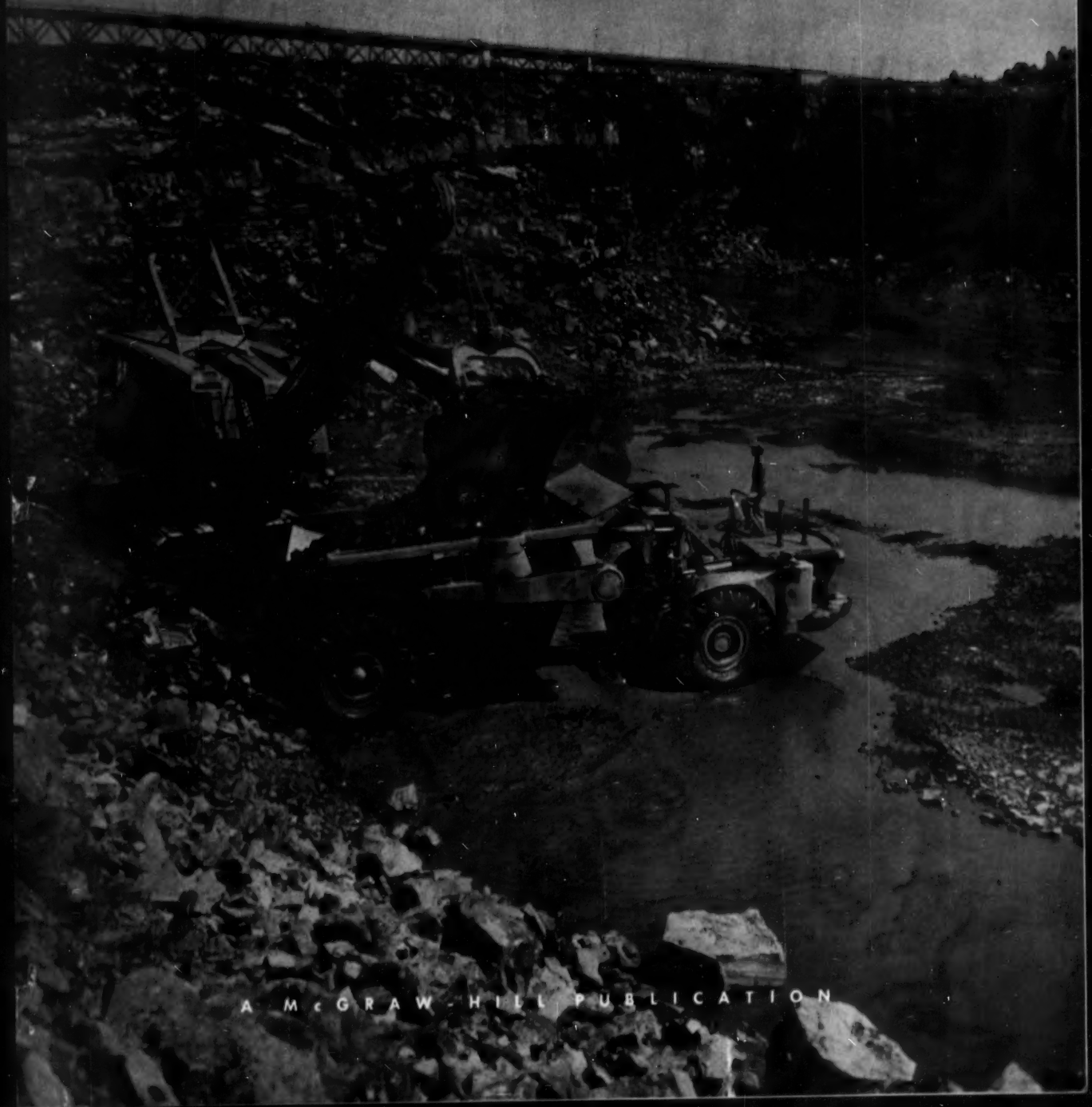
50 CENTS

CONSTRUCTION
METHODS AND EQUIPMENT

May 1956



A McGRAW-HILL PUBLICATION

tough digging

tough wire rope

Yellow Strand Flattened Strand

Yellow Strand Flattened Strand is used by Donlon Construction Co., Nashville, Tenn., in this ¾ yard backhoe on tough rock cut for sewer line.

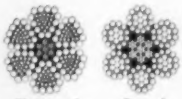
Here's the wire rope designed for the shock, pull, jerk of digging in rock. It's Yellow Strand Flattened Strand shown working for Donlon Construction Co., Nashville, Tenn. Donlon is cutting a 15-foot deep cut—most of which is rock—in preparation for laying a 15-inch sewer line. Donlon chose Yellow Strand Flattened Strand for the job because they knew it would stand up longer . . . take more abuse . . . turn in more profitable work under these rugged conditions. The Superintendent on the job, Clyde Fuqua, reports, "There's less breakage by using Flattened Strand Yellow Strand."

Superintendents on tough jobs everywhere will tell you the same story. Here's why! Yellow Strand Flattened Strand is formed of strands laid up in triangular form. The design gives a smoother outer surface with more contact points, less abrasion. With Flattened Strand, you also get 10% greater strength, greater compactness for longer, more profitable life under toughest conditions.

So, if constant wire rope failure and breakage on tough jobs are robbing you of profits . . . switch now to Yellow Strand Flattened Strand. Your B & B Distributor will give you more reasons why you should.

COMPARE

Yellow Strand Flattened Strand with Round Strand Wire Rope. In Flattened Strand you have twelve contact points, greater bearing area, smoother surface, less wear. Result: longer service, lower final cost!



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Broderick & Bascom Rope Co.

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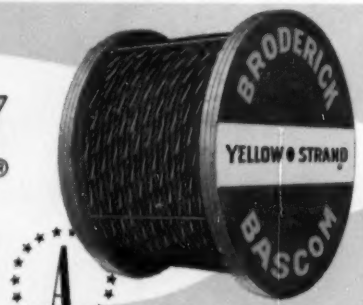


American Logging Tool Corporation is a subsidiary of Broderick & Bascom Rope Co.

B.F.Goodrich

It chews up a river bed

A typical example of B. F. Goodrich improvement in rubber

BENEATH that water, there's a wonderful supply of stones, gravel and sand—all used in making concrete. They scoop them out of the river bed and into the dredge with a series of metal buckets that work like an escalator. Only one trouble.

The heavy load was just too much for the rubber drive belt that keeps the buckets moving. The belt would stretch. Then everything stopped until it was shortened, fastened back together again. For years, it was the same with every belt tried. They all stretched too much, wore out too soon.

Then a B. F. Goodrich man got them to try a Highflex belt—an improved design that has better resistance to strain, practically no stretch, and many other important advantages your distributor will be glad to demonstrate. You can't see this improved B. F. Goodrich belt at work here—it's below decks. But it has been on the job seven years now—longer than any other belt used before. And it has never stretched, never needed to be shortened.

Product improvement like this is always going on at B. F. Goodrich. New ways are constantly being found to make transmission belting, conveyor belts, hose of all kinds work better, last longer. No product is ever regarded as "finished" or standardized.

How this cuts your costs: Because of these improvements and because B. F. Goodrich is one company that will *never* lower its quality standards, you can be sure of top performance and real money savings when you specifiy B. F. Goodrich. To find out about the latest improvements in the rubber products your company uses, call your BFG distributor or write *B. F. Goodrich Industrial Products Company, Dept. M-637, Akron 18, Ohio.*

B.F.Goodrich

INDUSTRIAL PRODUCTS

Symons FIELD REPORT...

Symons Forms used on Ohio River Intake Job...

60,000 square feet of concrete forming went into this job constructed for the city of Henderson, Kentucky. The wall started at elevation 317 (sea level elevation) or 21 feet below the river pool stage and when completed was topped at 385 or 47 feet above the water.

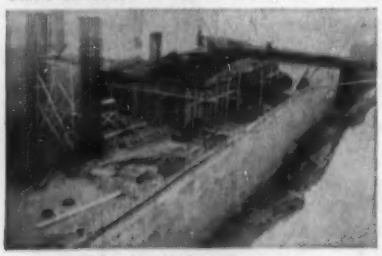
15,000 square feet of Standard Symons Wood Frame Forms were used, in sizes 2′ x 4′, 2′ x 6′ and 2′ x 8′.

George Ryan, Vice President said, "Even in the eight foot lengths our Symons Forms are easily carried by one man. Another feature which we have found helpful is the ease of removing a panel at any place in a wall to clean keyways and straighten reinforcing steel. This has saved us a lot of time."

Three piers for an all access bridge to the intake structure were also formed with Symons Forms. Part of the project involved an extension of the Henderson power plant.

Symons Forms can be rented with purchase option, all rentals to apply on purchase price. Symons Clamp & Mfg. Co., 4255 Diversey Avenue, Dept. E-6, Chicago 39, Illinois.

Roy Ryan Sons Company, Inc., Evansville, Indiana
General Contractor



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CONSTRUCTION

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Number 5

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Established 1919

May 1956

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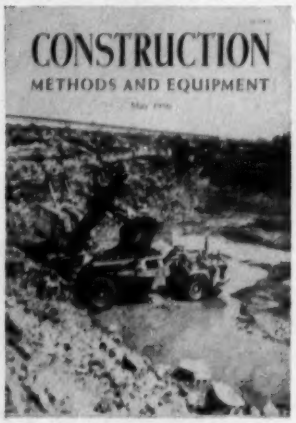

On the Cover

Spring is here, and contractors on the St. Lawrence Seaway and Power Projects are shifting to high gear for a big construction season. Photo shows a P&H shovel loading an Athey PR21 pulled by a Cat DW21 on a section of the Seaway near Montreal. Contractor is McNamara-Pigott-Peacock, Toronto.

COMING IN JULY— Valuable equipment maintenance information will fill the entire July issue of CONSTRUCTION METHODS AND EQUIPMENT. The issue will be devoted to supplying the information every contractor needs to keep his equipment productive for long periods of time at the lowest possible cost. The issue also will include an up-to-date listing of service manuals.

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Pay Dirt in This Issue

May, 1956

Tricky Tilt-Up Cuts Warehouse Cost 52
A 120,000 sq-ft warehouse goes up in only 70 calendar days. Clever forms and tilt-up rigging are key factors.

Single Engine Powers Big Crusher 55
A single diesel-electric generating set supplies power to 11 motors on a big portable plant near Atlanta, Ga.

Tunnel Opens Heart of Boston 57
Contractor pushes 2,400-ft open cut tunnel through busy downtown area with minimum disturbance of heavy traffic.

Gimmicks Speed African Pipe Line Job 62
American construction crews lay two 7,000-ft underwater pipe lines for a U.S. airbase in race against storms.

Remove Shaft Forms Intact 65
After column clamps are lifted off in a bundle, a jack pops square box form free for stripping in one piece.

Building Big Hangars Demands New Methods . . . 73
A CM&E special feature describes new construction techniques used by contractors at three big hangar jobs.

Paving . . . How to Get the Best Results 119
The ninth article in CM&E's series gives pointers on the best techniques for jointing and curing concrete slabs.

Big Aggregate Plant at Table Rock Dam 159
A mile-long conveyor carries crushed rock from quarry to processing plant. Aggregates are pre-cooled in silos.

Construction News from Washington 13
Job Talk 18
It's Your Business 30
Picture of the Month 41
Construction News in Pictures 42
Construction 'Round the World 46
Editorial 51
Brownlee Dam Gets Off to Fast Start 94
Crane, Monorail Erect Heavy Panels 114
McGraw-Hill Editorial 153
Wind Tilts Lift-Slab Garage 176
Scaffolds Hang from Ceiling 180
Bolting Requires Frequent Checks 197
Maintenance Shop 206
Contractor-Labor Relations 211
Construction Men in the News 219
Sales and Service 223
Construction Equipment News 229
Methods Memo 278

NEXT MONTH

Building a draft tube form for a hydroelectric powerhouse is a lot like building a wood ship. Both require intricate formwork. But a clever Georgia contractor cuts costs with mass production and simple fabrication of these highly complicated forms.

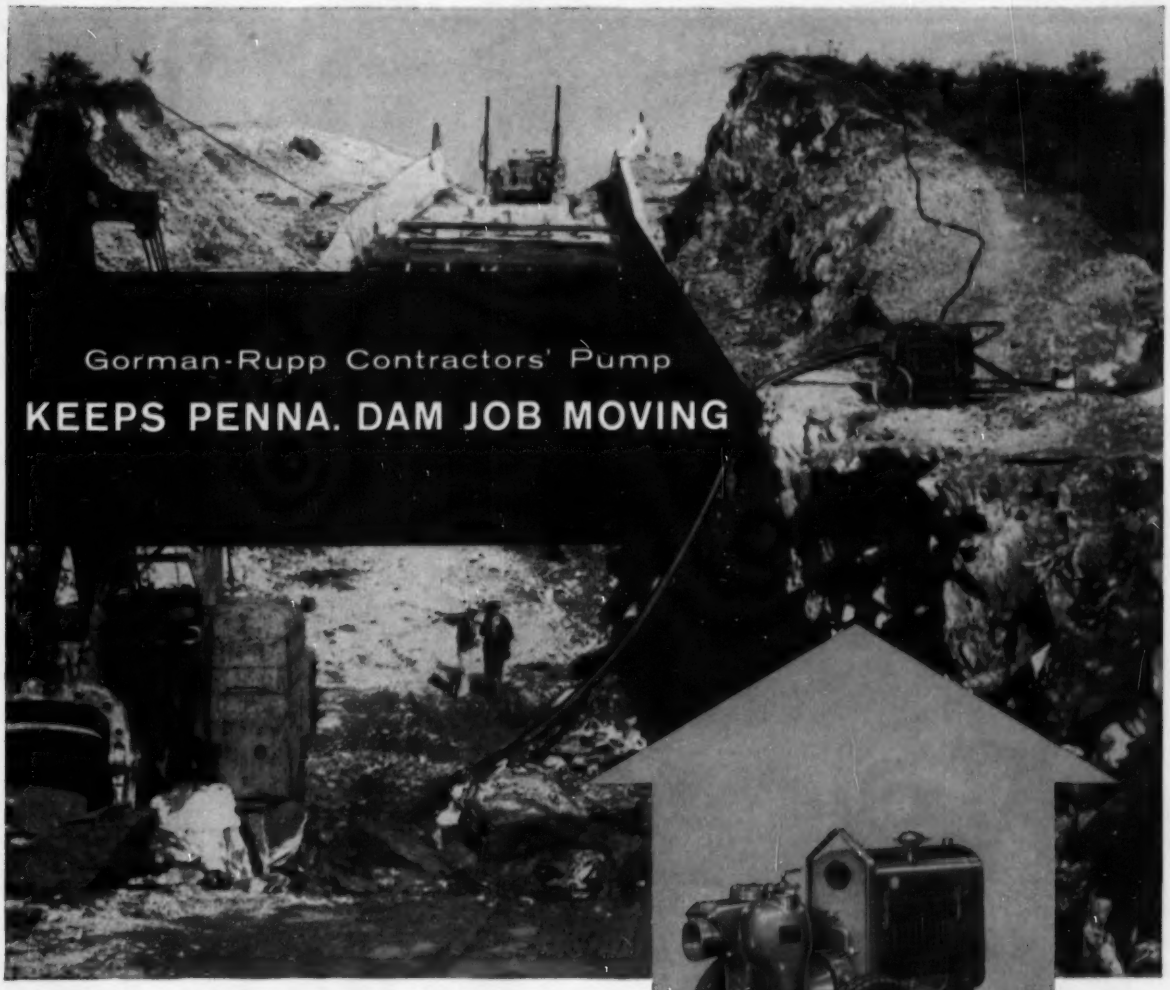

Photo by Jerry Pratt, Constructioneer

Near Spring Grove, Pa., a 1,100,000,000-gallon earth dam is being constructed for P. H. Glatfelter Co., producers of paper, by Central Pennsylvania Quarry, Stripping and Construction Co. Seepage in the spill-basin is quickly removed by a Gorman-Rupp 90M Pump, Model 3602, letting work proceed on the removal of solid rock. The pump stands about 20 feet above water level and is discharging over the rise, as shown in the upper right of the picture. The 500-ft. spillway chute handles overflow from the 2½-sq.-mile dam.

Keep *your* job moving with a Gorman-Rupp Contractors' Pump.

Sizes: 1½", 2", 3", 4", 6", 8", 10". Engine-driven, motor-driven and basic pumps. Every pump covered by the Gorman-Rupp plain language guarantee.

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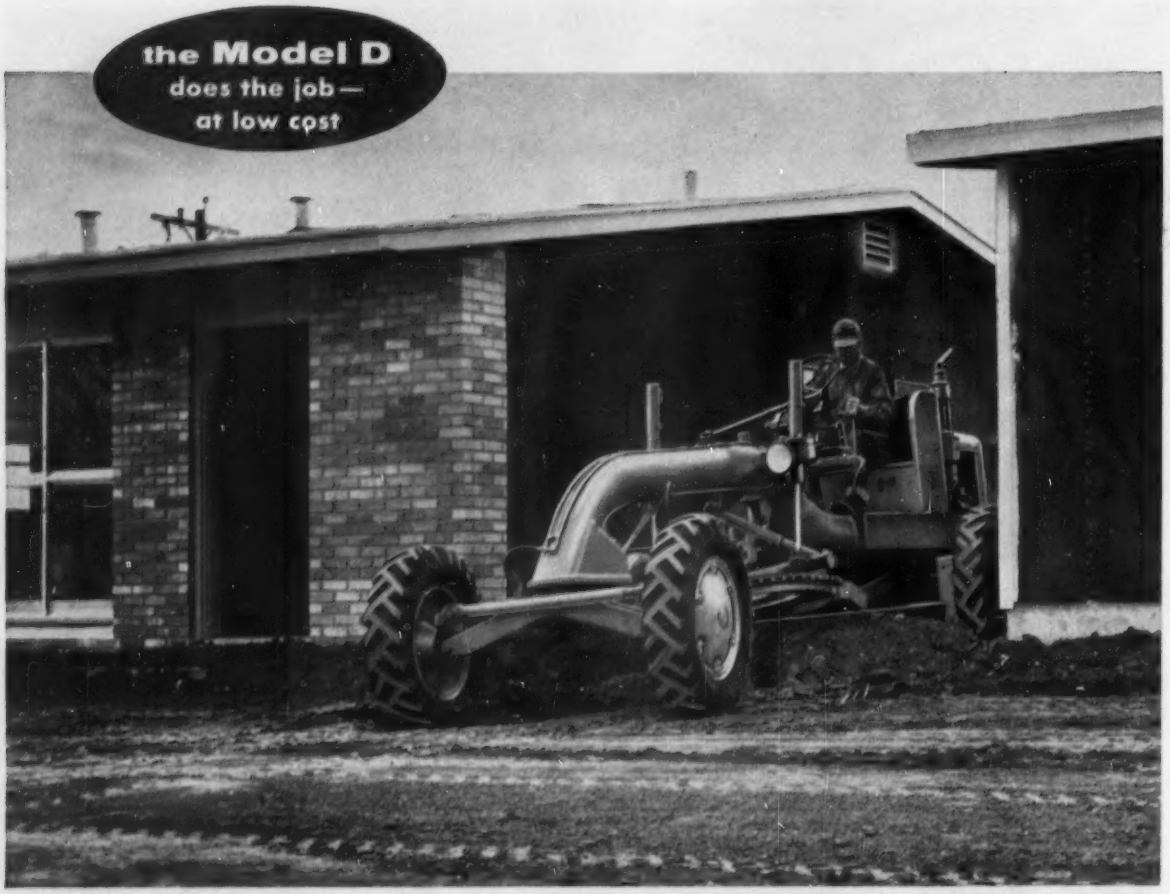

"Never lets me down"

says Everett Datton, San Antonio, Texas, about the Allis-Chalmers Model D Motor Grader.

It's two homes a day, out Texas way—as Quincy Lee Construction Company works on a big-scale project of building 1400 new homes in two years.

One of the machines on the job is an Allis-Chalmers Model D motor grader used to grade roads, landscape homes and build driveways. Owner Quincy Lee says this about his Model D: "I'm very happy with it. It does a very fine job for us." Operator Everett Datton says,

"I like the Model D. It gets in and out of tight spots, especially where buildings are close together. With the D's fine control I can work between newly-planted trees and close to sidewalks without damaging trees or chipping cement. Not only is this machine good at fine grading, but its diesel engine has plenty of power for handling full capacity loads. I run it 9 hours a day, 5½ days a week. *She never lets me down.*"

• • •

Quincy Lee and Everett Datton are confirming what thousands of other Model D operators and owners know. In its class, you just can't beat the D for sure-fire performance at low cost. Watch it in action and you'll be amazed how the D's right combination of weight, power and traction lets it handle a wide range of jobs. And you can choose either diesel or gasoline engine models, plus number of attachments—including rear-mounted ⅜-yd loader and midship-mounted hydraulic scarifier, to increase the Model D's usefulness and efficiency.

See the Model D now at your Allis-Chalmers construction machinery dealer—headquarters for factory-trained servicemen, factory-approved facilities and True Original Parts.

Model D
50 belt hp diesel or gasoline engine

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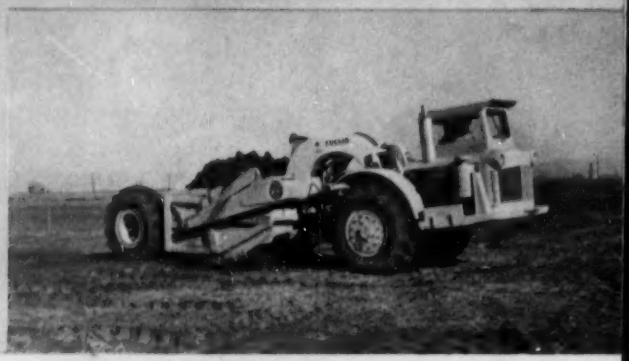
Hydraulically controlled lever action provides fast, positive and independent operation of bowl, apron and ejector. Down time and delays caused by cable breakage are completely eliminated. All major components and the entire power train are readily accessible for easy servicing and maintenance.

Have your Euclid Dealer give you facts and figures on the S-7 and S-12 so you can compare them with your present equipment . . . you'll find that ***Euclids are your best investment.***

7 yds. struck . . . 8 yds. at 3:1 slope . . . 9 yds. heaped at 1:1. . . 18.00 x 25 tires with 21.00 x 25 optional . . . 143 h.p. . . . NoSpin differential . . . non-stop 180° turn in 28 ft.

See you at the ROAD SHOW CHICAGO Jan. 26-Feb. 2, 1957

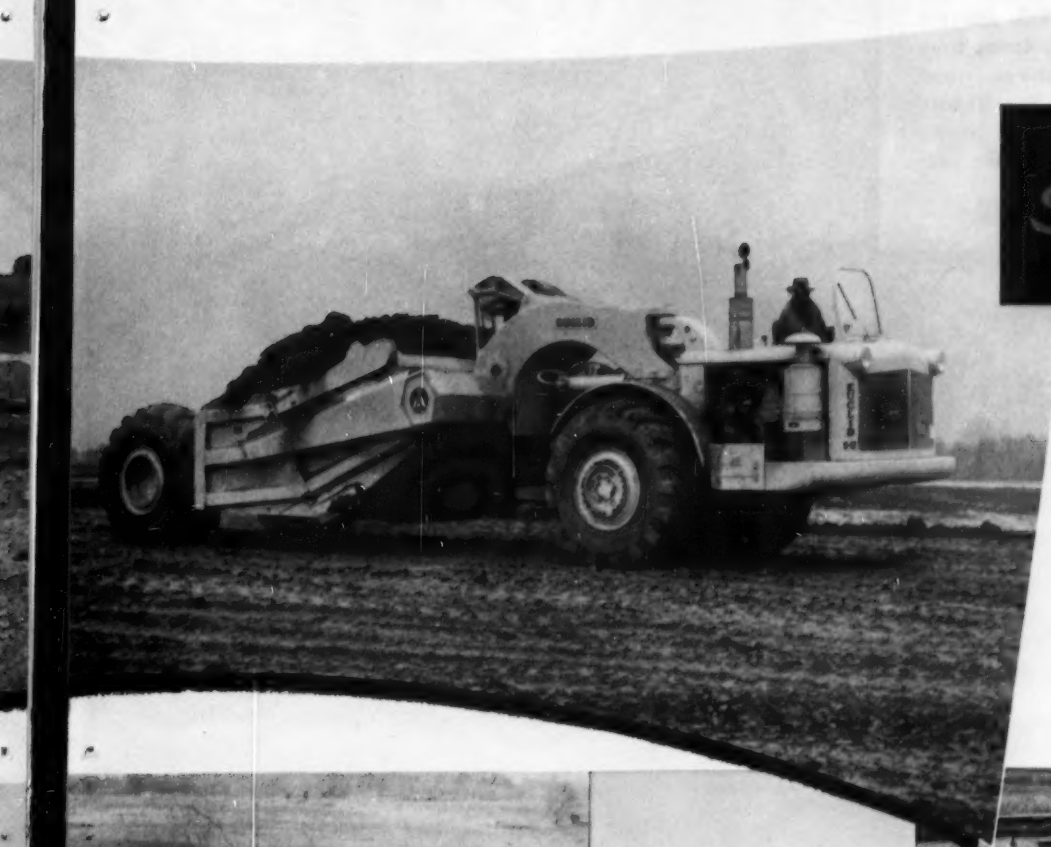
Easy maneuverability of the S-7 makes it a versatile earth-mover for a wide range of work. Full hydraulic steering permits non-stop turns in only 28 feet . . . enables the unit to get in and out of close quarters. Here a load of topsoil is being spread at a New Jersey housing project.



With its low, wide bowl and adjustable 4-section cutting blade, the S-7 is a fast, easy loader . . . picks up heaped loads without pusher assistance in good materials. This "Euc", equipped with cab, is working on a big land leveling project in the state of Washington.

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

S-7 and S-12
"EUC" Scrapers



12 yds. struck . . . 14 yds. at 3:1 slope . . . 16 yds. heaped at 1:1 . . . 26.5 x 25 tires . . . 218 h.p. . . . 9′ 6″ width of cut . . . NoSpin differential non-stop 180° turn in 31 ft.

Big 26.5 x 25 tires, NoSpin differential, Euclid planetary drive axle and 218 h.p. engine give the S-12 plenty of power and traction to pick up heaped loads in a hurry. On this Tennessee highway job, the 28 mph top speed with capacity payloads was a big factor in maintaining high production at low cost.

Contractor preference for "Euc" Scrapers results from pay-off performance on the job.

Rugged construction of the S-12 keeps down time to a minimum—it's designed for work on the toughest jobs with big push tractors. Heaped loads of heavy clay—15 yds. and more—were picked up in a short travel distance on this South Caroline railroad grading project.

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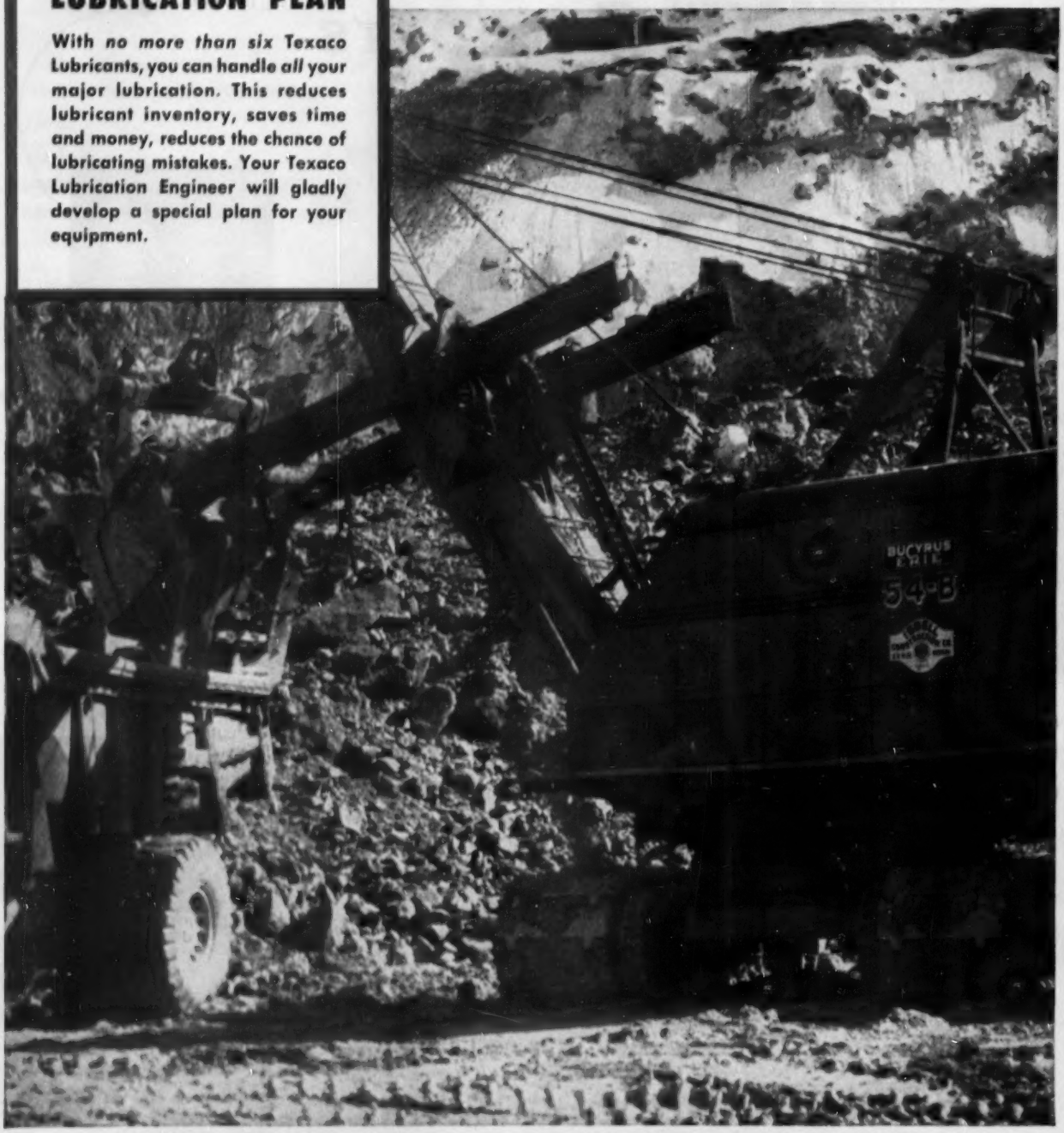

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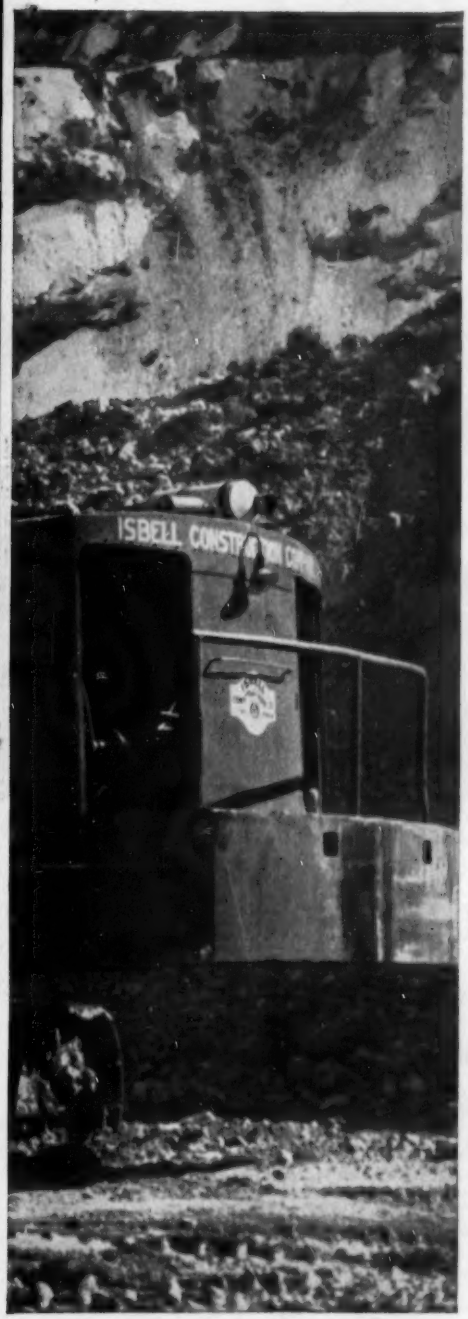

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FOR ALL CONTRACTORS' EQUIPMENT

Aerial view of Sewage Treatment Plant, Valparaiso, Indiana. Duraplastic cement provides protection against freezing-thawing weather.

Construction view of tank shows Duraplastic-made concrete in place. Duraplastic gives excellent placeability and durability.

"Our contractors are completely satisfied with Duraplastic*"

. . . **said Ready-Mix supplier** Byron Smith, President of Smith Nuppnau Ready-Mix, Inc., Valparaiso, Indiana. "Duraplastic's ability to fortify concrete against freezing-thawing weather is outstanding, and the lack of segregation and reduced finishing time please contractors."

You, too, will get more durable, more uniform concrete with Atlas Duraplastic air-entraining portland cement, because you get a more plastic, more cohesive mix. Less mixing water is required for a given slump . . . segregation and water gain are minimized.

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CME-D-181-C

Atlas® Duraplastic Cement

MAKES BETTER CONCRETE AT NO EXTRA COST

United States Steel Hour—Televised on alternate Wednesdays—See your local newspaper for time and station.

Construction News from Washington . . .

Washington, D.C.
May, 1956

First Upper Colorado contracts

Pres. Eisenhower has asked Congress for the first construction money to start the huge $760-million Upper Colorado River Storage Project. The initial request for $8 million, when approved, will be tapped first to build the access roads needed to reach the two biggest dams in the project—the $421 million Glen Canyon Dam and the $83 million Flaming Gorge Dam. These contracts will go out within six months.

The first money also will be used to pay for driving the diversion tunnels at the Glen Canyon site. Bids for this work will be taken by June of next year. Remaining funds will go for field engineering and completion of construction drawings for the five participating irrigation units, for which bids will be asked sometime after the summer of next year.

New reclamation business on the way

Money to begin construction of new reclamation projects has been asked of Congress by Pres. Eisenhower. The projects were authorized earlier this year; bid invitations are expected to begin going out by fall. First project to get under construction will be the $27 million Ventura Project in Southern California. Money is also asked to begin the $40-million Washita Project in Oklahoma and to add on to the Gila Project in Arizona.

Two earthfill dams are the big structures for the Ventura and Washita Projects—one to be 80 ft high and 9,800 ft long, the other 275 ft high and 1,000 ft long.

Lease-purchase bid forms ready

Bid forms for the first government lease-purchase construction are available from General Services Administration headquarters, Washington 25, D. C., or from the Chicago Regional Office. It's a $1.6-million federal office building in Rock Island, Ill. Bids are asked from contractors, from investors, and from contractor-investor teams.

This first bid invitation will be followed by about 25 others from GSA this year, totaling about $90 million worth of business. Bids on lease-purchase buildings are about to be asked by the Post Office Department, too.

Highway expansion gets green light

House approval gives a big leg up to the multi-billion dollar highway construction bill. The Senate last year approved a measure

calling for increased spending; the experts now see only favorable signs for adoption of a pay-as-you-go program that Pres. Eisenhower will sign. If the law is approved, funds to get the dirt flying will be available almost immediately for allocation to the states.

Road builders are ready

The American Road Builders Association has taken a closer look at the construction industry's ability to carry the additional load that an expanded highway building program would bring. About a year ago, ARBA found that the materials, the equipment, the contractors, and the engineers were on hand to handle the increased load as it came along.

The new study was made in view of recent shortages of such key materials as steel and cement—shortages that cropped up as the result of the across-the-board construction boom. The question came up again: can a huge new highway program be superimposed on an industry that appears already loaded close to capacity.

ARBA task forces studying each critical element found that the industry's ability to produce is equal to any demand that's now foreseen.

Commerce surveys equipment makers

Construction machinery manufacturers—550 of them—are being asked by the Commerce Department to report new information on their activities last year.

Officials of the Business and Defense Services Administration want to know how much copper, steel, and aluminum each company used last year, the company's capacity to produce, and its backlog of orders at year's end.

BDSA wants the data to use for mobilization and civil defense planning. The survey is approved by representatives of the construction manufacturers working with BDSA; the plan is to make it an annual affair.

Eisenhower's construction program: $3.7 billion

A roundup of the Administration's new proposals for construction shows that spending for the year beginning this summer will be only $87.2 million. But the total to complete these projects is estimated at $3.7 billion. This figure includes such projects as Upper Colorado, 5 reclamation projects, Passamoquoddy, Great Lakes channels, TVA steam plants, military public works, and atomic plants. Most of these projects are either approved or about to be approved.

However, this total does not include the highway program—which would provide an average of $3 billion a year in federal funds for 13 years—nor the program of federal aid for school construction, which, if passed, would call for $2 billion over a five-year period.

RUGGED WAGNER EQUIPMENT

makes a tractor your most versatile and inexpensive construction tool

Now a tractor can be the most important single tool on your construction jobs. When it's teamed up with rugged Wagner tractor equipment, nothing else can do so many jobs so well.

By equipping a tractor with a Wagner Backhoe you make short work of digging footings, sewer, gas and power trenches and septic tanks. Likewise a tractor and a Wagner loader do a faster, better job of land clearing, excavating, backfilling and landscaping. And all the while you'll be speeding construction, saving man-hours and increasing profits.

Check with your nearby Wagner dealer to see how Wagner tractor equipment can cut time and labor costs on your construction jobs.

wagner
TRACTOR EQUIPMENT

WAGNER IRON WORKS, | 1905 South 1st St., Milwaukee 1, Wis. | Dept. 11

Send me more information on Wagner Tractor Equipment for a ..... (make) ..... tractor.

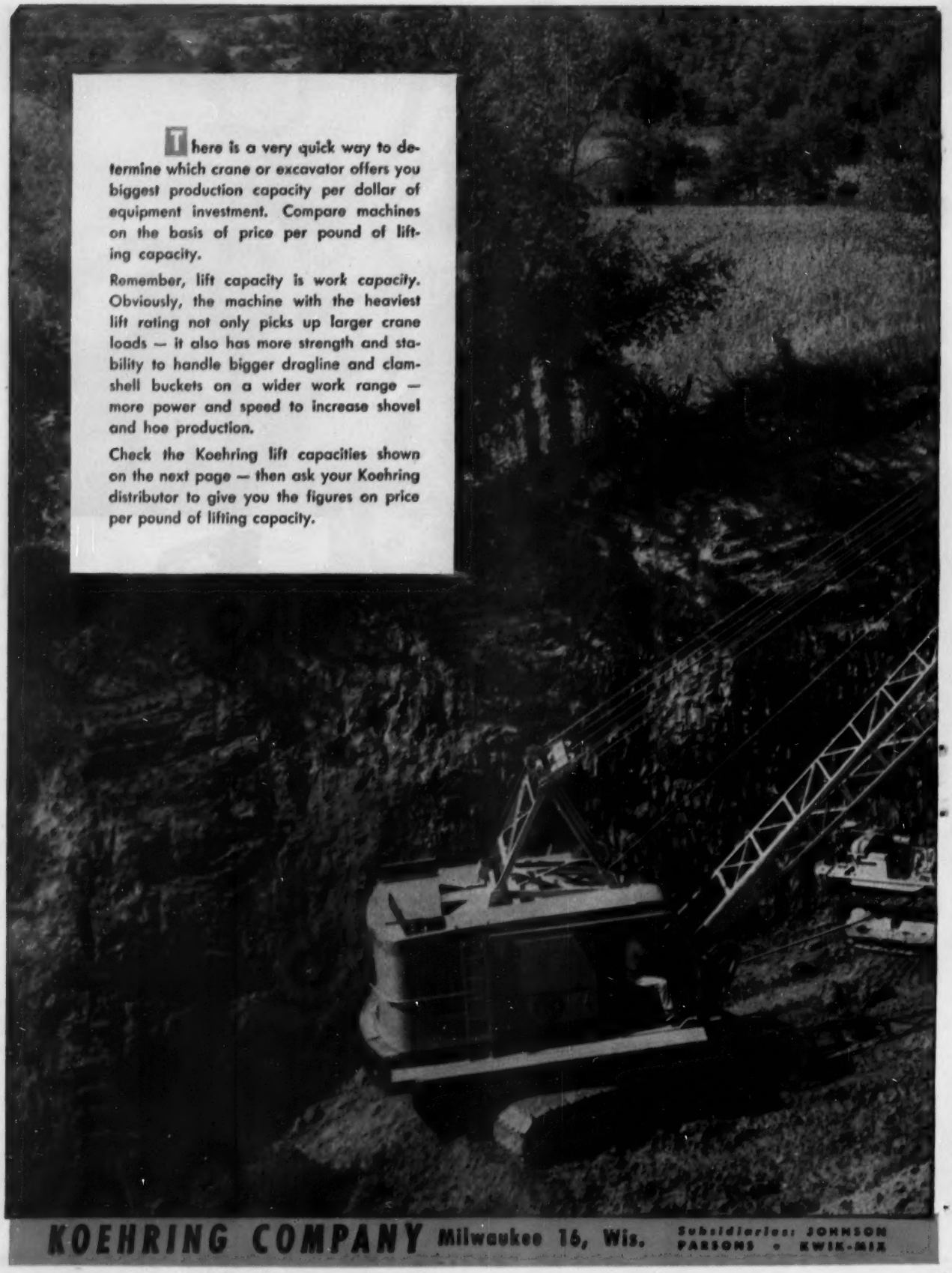
NAME .....

COMPANY .....

ADDRESS .....

CITY ..... STATE .....

"WAGNER BUILT" MEANS "BETTER BUILT" FOR OVER 105 YEARS

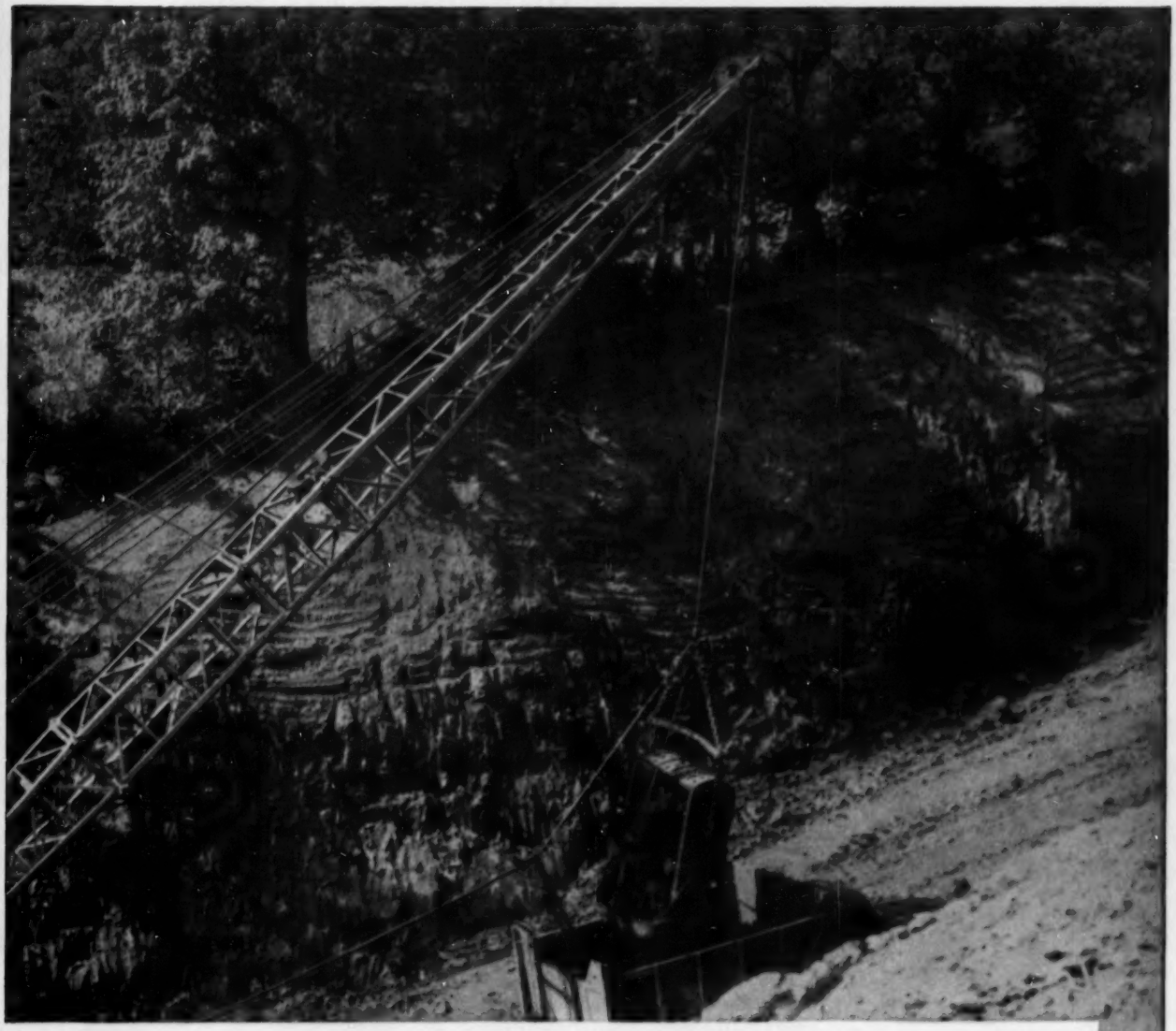


There is a very quick way to determine which crane or excavator offers you biggest production capacity per dollar of equipment investment. Compare machines on the basis of price per pound of lifting capacity.

Remember, lift capacity is *work capacity*. Obviously, the machine with the heaviest lift rating not only picks up larger crane loads — it also has more strength and stability to handle bigger dragline and clamshell buckets on a wider work range — more power and speed to increase shovel and hoe production.

Check the Koehring lift capacities shown on the next page — then ask your Koehring distributor to give you the figures on price per pound of lifting capacity.

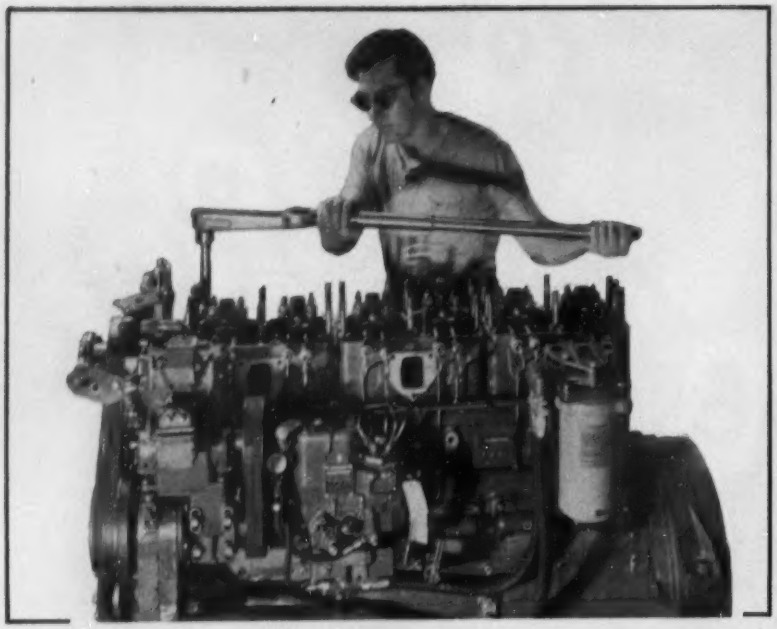
KOEHRING COMPANY Milwaukee 16, Wis. Subsidiaries: JOHNSON • PARSONS • KWIK-MIX



Check price per pound of lifting capacity

KOEHRING MODEL	SIZE DIPPER	KOEHRING LIFT CAPACITIES (Crawler ratings based on 75% of tipping load. Rubber-tired machines — 85% of tipping load)		PRICE PER POUND OF LIFT CAPACITY*
205 CRAWLER	½-Yd.	20,000 lbs.	30-foot boom at 10-ft. radius	?
205 ON RUBBER	½-Yd.	30,000 lbs.	25-foot boom at 12-ft. radius	?
304 CRAWLER	¾-Yd.	27,800 lbs.	35-foot boom at 12-ft. radius	?
304 ON RUBBER	¾-Yd.	50,000 lbs.	30-foot boom at 10-ft. radius	?
405 CRAWLER	1-Yd.	40,000 lbs.	40-foot boom at 12-ft. radius	?
605 CRAWLER	1½-Yds.	72,300 lbs.	50-foot boom at 12-ft. radius	?
1005 CRAWLER	2½-Yds.	159,000 lbs.	50-foot boom at 12-ft. radius	?

Figures available on request—ask your Koehring distributor for them.



you can't check air pressure by kicking a tire

. . . And you can't check bolt tension by "wrist feel."

FREE . . .

BOOK OF TORQUE SPECIFICATIONS

Your *Snap-on* man will be glad to give you a valuable free book listing torque specifications covering all makes of cars, trucks, tractors and industrial engines. Ask for it along with new *Snap-on* tool catalog or write direct to *Snap-on*.

That's why top mechanics depend on the *Snap-on** torqometer to take the gamble out of every operation where bolt tension is specified, like take-up on main bearings, cylinder heads, connecting rods and manifold nuts.

And there's nothing to it. Set the adjustable dial at the bolt tension specified by the manufacturer and tighten until the easy-to-read pointer reaches zero or the bulb on the flash model lights.

Snap-on builds 39 torqometer models ranging in torque capacities of from 0-30 in. lb to 0-4000 ft lb and 0-35 c. kgs. to 0-280 m. kgs. Let a *Snap-on* man show you its advantages by demonstrating a torqometer on your job. He will help you choose the right model for your specific needs.

*Snap-on is the trademark of Snap-on Tools Corporation.

SNAP-ON TOOLS CORPORATION

8042-E 28th Avenue • Kenosha, Wisconsin

Job Talk . . .

Loader with Boom Quickly Lays Pipe

A Pettibone-Mulliken front-end loader with its bucket replaced by a crane-jib is doing a fast job of laying pipe at New York's Idlewild Airport. The one-man-operated rig hauls pipe sections to the trench and easily maneuvers them into position. The boom rotates in a half circle both horizontally and vertically. The job is being done by Tufano Contracting Corp.

Special Tractors Handle Materials at South Pole

Specially constructed crawler tractors did the major part of the materials handling during the first year of the Navy's Operation Deepfreeze in Antarctica.

Virtually all supplies were hauled from shipside to the bases at Little America and Williams Air Operations Facility by crawlers and sleds. The tractors were busy constantly maintaining trails, leveling sites for buildings, and pulling 9-ton snow compacting rollers to construct airstrips. Hyster cranes on the back of tractors unloaded heavy packages, including many 5,000 to 9,000-lb Caterpillar diesel-electric sets. They also set in place 3,000-lb sheet metal sections for fuel storage tanks.

(Continued on page 20)

THE JOB: straighten a road, build bridge approaches **AND MOVE A RIVER!**

This CAT* No. 12 Motor Grader is helping cut out a new channel for the Iowa River near Marshalltown.

It's part of a project which called for straightening curves in a county road, building approaches to a bridge, and diverting a meandering river beneath its new span. The length of road involved was only 0.8 of a mile, but Mickle and Ross Construction Co., of Newton, Iowa, moved nearly 100,000 cu. yd. of dirt.

Foreman Virgil E. Reynolds had a fleet of 11 Caterpillar machines on the job. "We don't have an off-breed in the outfit," he said.

Working close to water like this is tough going. The No. 12 had to maneuver in mushy, sandy loam. "Occasionally machines hit silt pockets and nearly dropped out of sight," Supt. Reynolds said, "but I never worry when I've got the right equipment... and I've got the right equipment."

The No. 12 is "the right equipment" for contractors all over the country—for four big reasons. Costs less to maintain. Costs less to operate. Produces more. Lasts longer.

Your dealer would like a chance to back up each one of these claims with specific details. The exclusive Caterpillar oil clutch, for instance, that gives up to 1500 hours' service without adjustment. And the new tubeless tires (now standard equipment) that can eliminate 80% of the down time caused by tires.

Let your Caterpillar Dealer demonstrate the dozens of other features that make the No. 12 the high-producing, cost-cutting motor grader it is.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

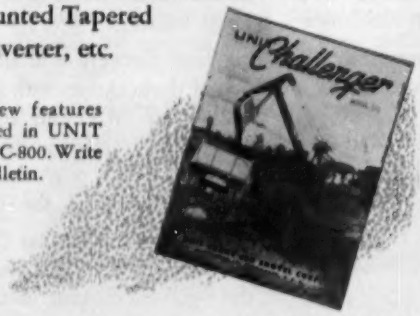
99% OF ALL CAT MOTOR GRADERS EVER BUILT ARE STILL ON THE JOB

UNIT
MODEL 510

THE NEW UNIT Challenger . . . as a DRAGLINE

NOTHING BUT THE BEST! There's no substitute in the ⅜-yard excavator field for EXPERIENCE. UNIT has it! UNIT knows what you need in a ⅜-yard machine . . . knows how to engineer the power, over-all performance-superiority and economy of operation for the jobs you want to do profitably with a ⅜-yard dragline, clamshell, crane or trenchoe. The New UNIT CHALLENGER proves this with such features as: **Self-aligning Hook Shoes . . . Force Feed Lubrication . . . Full Floating Trunnion-Mounted Tapered Drums . . . Torque Converter, etc.**

See the many other new features illustrated and described in UNIT CHALLENGER Bulletin C-800. Write for your copy of this bulletin.



UNIT CRANE & SHOVEL CORP.
6305 W. Burnham St. • Milwaukee 14, Wis., U.S.A.

Geared to boost your earnings!

JOB TALK . . .

Continued from page 18

There were many hazards, especially the thin ice at shipside. Heavy weight of the D8s made offloading particularly precarious. As a precaution, they were fired up before leaving the deck of the ship so that an operator could drive them away as soon as they landed on the ice.

D8s assigned to hauling sleds seldom approached a ship. Generally, empty sleds were pulled to shipside by a D2 tractor, and the D8 winched the loaded sled away until the drawbar could be engaged. In all, about 500 trips were made. Tractors hauled about 8,300 long tons of supplies and equipment an average of 4½ mi at two sites.

Initially, about half the supplies were unloaded a comfortable 1½ mi from the ship at Little America. Then, when the thaw came after New Year's, Seabees spent a hectic 60 hr hauling those supplies the remainder of the 5-mi total distance to the basesite.

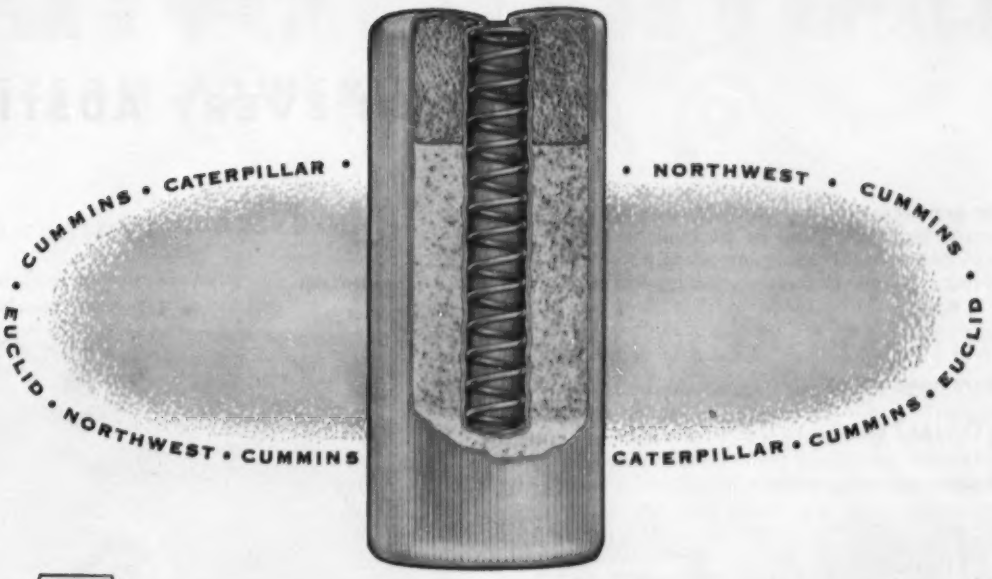
Much of the route included 5% grades. Often D2s hauled 20-ton sled loads to the foot of the shelf ice where the big D8s took over. One tractor fitted with a bulldozer blade had a constant job of maintaining the trail.

Next fall, the task force will return to begin Deepfreeze II. Admiral George J Dufek USN (Ret.) is in command.

Simple Device Mounts Vibrators on Spreader

A pair of steel channels that pivots on the back of a Blaw-Knox concrete spreader easily handles small vibrators. Westbury Paving Corp. equipped the spreader to vibrate close to the forms on apron work. A single hydraulic pump lowers

(Continued on page 24)



MANNIX LTD.

PROTECTS ITS ENGINES WITH WINSLOW FILTERS

Mannix Ltd., operators of one of the largest machinery pools in North America, last year standardized on Winslow CP* elements for practically all powered equipment. Engine filters are stenciled to identify the correct filter element, and maintenance men and operators are provided with cross reference manuals that also specify the elements to be used.

According to Mannix service records, Winslow Filters have improved both the useful life of oil and the life of equipment, and the standardization program has shown advantages in efficiency and economy. The principal gain has been in longer periods between engine overhauls, and reduced repair costs and operating expense for many types of powered equipment.

WINSLOW FILTERS

CP (controlled pressure) is protected by patents and trademarks.*

Winslow Engineering Company • 4069 Hollis Street • Oakland 8, California

TEAMMMED

IN EVERY AUSTIN-

Motor graders have come a long way since their first crude beginnings; and in the modern Austin-Western Power Grader many important features are teamed-up to give performance other graders cannot hope to equal.

Graders need great...

MOBILITY

... so Austin-Western provides ...

... All-Wheel Drive, giving tremendous climbing power to the front drivers, with a "live" front end that drives its own weight; instead of a dead front end that has to be pushed around by the rear drivers. All-Wheel Drive results ...

... in tremendous load-moving ability by applying more power at the blade—in all materials, and under all operating conditions—power that is made still more effective by Torque Converter drive.

MANEUVERABILITY

is needed, too ...

...and with All-Wheel Steer, Austin-Western graders are twice as maneuverable as those with front steer only; steering that lets you "swing that rear end" for handling every job with maximum efficiency.

BLADE

MANIPULATION

is another important factor ...

The Extreme Blade Reach; a plus benefit on many jobs, such as finishing without leaving tire marks.

The High Lift Blade; for handling any degree of slope, from flat to vertical.

The Precision Sideshift of the blade; for keeping it under perfect control at all times.

The Completely Reversible Blade; for those rare occasions when it is necessary or desirable to grade in reverse.

The Power Graders That Have Everything

TO OUTPERFORM

WESTERN POWER GRADER

MANAGEMENT

—or control—of the machine is also important, and Austin-Western provides . . .

. . . Full Hydraulic Control—finger-tip management for instant response and precision operation. There's no lost motion—nothing to tire the operator. It's this hydraulic operation that makes Austin-Western graders so easy to manage. Now, the Blade Action . . .

. . . teams up with All-Wheel Drive and All-Wheel Steer so that all work together to move more material—and in more places. The working together of these three features—mobility, maneuverability and blade manipulation—is called . . .

CONTROLLED TRACTION . . .

. . . with the rear end swung to either side, although the grader moves straight ahead. All-Wheel Drive and All-Wheel Steer team up with the blade—so that the *rear* drivers *push* behind the *toe* of the blade—and the *front* drivers *pull* ahead of the *heel* of the blade; and the Austin-Western grader *moves straight ahead*—under perfect control—with no side slip. Whatever the material, Controlled Traction moves more of it—farther and faster.

Yes, every Austin-Western Grader has four BIG "M" features that are *teamed to outperform* . . . the extreme mobility and earth-moving ability provided by All-Wheel Drive and the Torque Converter . . . the extraordinary maneuverability resulting from All-Wheel Steer . . . the unusual versatility of blade manipulation . . . and the easy management of all functions by full hydraulic control.

Austin-Western

Power Graders · Motor Sweepers
Road Rollers · Hydraulic Cranes

BALDWIN BLH LIMA-HAMILTON

Construction Equipment Division

Manufactured by
AUSTIN-WESTERN WORKS
CONSTRUCTION EQUIPMENT DIVISION
Baldwin-Lima-Hamilton Corporation
AURORA, ILLINOIS

Central Pennsylvania Quarry, Stripping & Constr. Co. uses Malsbary series 300 HPC cleaner on big "Euc." All trucks, tractors, graders, compressors, etc., are cleaned as part of regular maintenance. Note how nozzle confines force of hot solution to small area.

How Much Can You Save By Reducing Equipment Cleaning Time?

Here's experience of Malsbary HPC users:

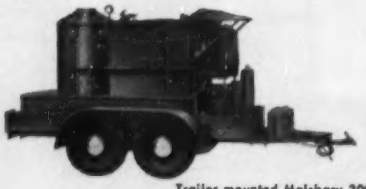
Cleans 4 times faster – Cleaning mud, grease and cement from ready-mix trucks with steam vapor cleaner required full day's downtime for each truck. Now a Malsbary 300 HPC (high pressure combination) cleaner cleans four trucks daily – and does better cleaning job.

Cleaning Reduces Cable Breakage – Mud froze in scraper bowls sitting overnight in zero weather, frequently causing cables to snap when starting next morning. Two Malsbary HPC cleaners remove mud from 35 tractor-scraper rigs nightly, thus ending morning-after cable breaks and lost time.

Malsbary HPC cleaners deliver lots of solution (240 to 2100 g.p.h.) at pressures to 400 p.s.i. With these pressures, hot solution, hot rinse or cold water literally blast away stubborn deposits of dirt that smaller cleaners can't touch. Users report these average cleaning times:

D7, D8 tractors	1½ - 2 hrs.
D8 with sideboom	2 hrs.
TD Dozershovel	2 hrs.
Payloader	45 mins.
Motor grader	3½ hrs.
1½ yd. shovel	3 - 4 hrs.

Compare the time you now spend cleaning similar equipment... check current costs of having equipment tied up for cleaning and repairs. Most likely you'll see how greatly Malsbary HPC cleaners can benefit your operation – as they have so many other construction equipment users. Only Malsbary HPC cleaners offer you seven cleaning actions from one machine. With series 300 and 500, you can operate two or more guns simultaneously—one delivering high-pressure cold water, the other high-pressure hot solution – a real time saver.



Trailer mounted Malsbary 300 for field cleaning.

Ask your Malsbary dealer to demonstrate on your job NOW, or write us for literature more fully describing HPC models.

87

MALSBARY MANUFACTURING CO

SINCE 1921

Room C, 845 - 92nd Ave., Oakland 3, Calif.

JOB TALK...

Continued from page 20

two rams which raise or lower the channels. The operator can control the rams from his seat. Vibrators are standard Vibro-Plus models, each powered by its own gasoline engine.

Device Warns Operator Of High Tension Wire

An electronic device is now available for warning crane operators when their booms wander close to power lines. The Electro-Alarm will detect a power line at distances from 8 in. to 400 ft, depending on the voltage in the line and the sensitivity setting made by the operator. The setting is determined by swinging the boom within the desired safe distance. The control is then advanced until a warning light in the cab flashes, and a horn sounds.

Reprints Available

Want some helpful tips on equipment, concreting, earthmoving or insurance?

If so, order your copies of these Construction Methods reprints today:

Earthmoving — An Art and a Science

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50¢ each, 10 or more, 40¢ each

Contractors' Insurance Protection

25¢ each, 10 or more, 20¢ each

Comparative Specification Sheets on:

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10¢ each sheet, 10 or more, 8¢ each

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& Equipment
330 West 42nd Street
New York 36, N. Y.

Lake View Sand and Gravel Company
Fond du Lac, Wisconsin

Trucks Run 100,000 Miles Before Overhaul with Cities Service C-300 Motor Oil!

CHART SHOWS LAKE VIEW'S 13-YEAR SAFETY RECORD

"Cities Service helped keep machinery in safest operating condition," says Manager Eugene Clement.

	SAFETY			
Year	Construction 1st Place	Group Awards 2nd Place	Building Supply 1st Place	Group Awards 2nd Place
1943			X	
1944	X		X	
1945	X		X	
1946	X		X	
1947	X			
1948		X		X
1949	X			X
1950	X		X	
1951				X
1952			X	
1953				X
1954				X
1955		X	X	

NOTE: Lake View also received a "No Accident Award" for years, 1945, '47.

Lake View Sand and Gravel also chalks up phenomenal 13-year safety record.

At Lake View Sand and Gravel Company, dump trucks run almost as much while standing as while moving.

"So you can see," says Manager Eugene Clement, "that the 100,000 mile overhaul period we're getting with Cities Service C-300 Motor Oil is really something!

"It's actually twice our former mileage with another brand of motor oil! And it certainly hasn't affected our safety record. For 13 years we've won Wisconsin safety awards—and we couldn't possibly have done it without top-notch maintenance and top-notch lubricants.

"Trojan H-2 Multi-Purpose Grease is an example of good, simplified lubrication. We use it for wheel bearings, water pumps and general chassis lubrication and find it not only offers greater water resistance, but also pumps easier in low temperatures. It's advantages like this that make me mighty glad I switched to Cities Service."

This is another report of a firm's outstanding results with Cities Service products. Find out what these products can do for you. Talk with your Cities Service representative or write: Cities Service Oil Co., Sixty Wall Tower, New York 5, N. Y.

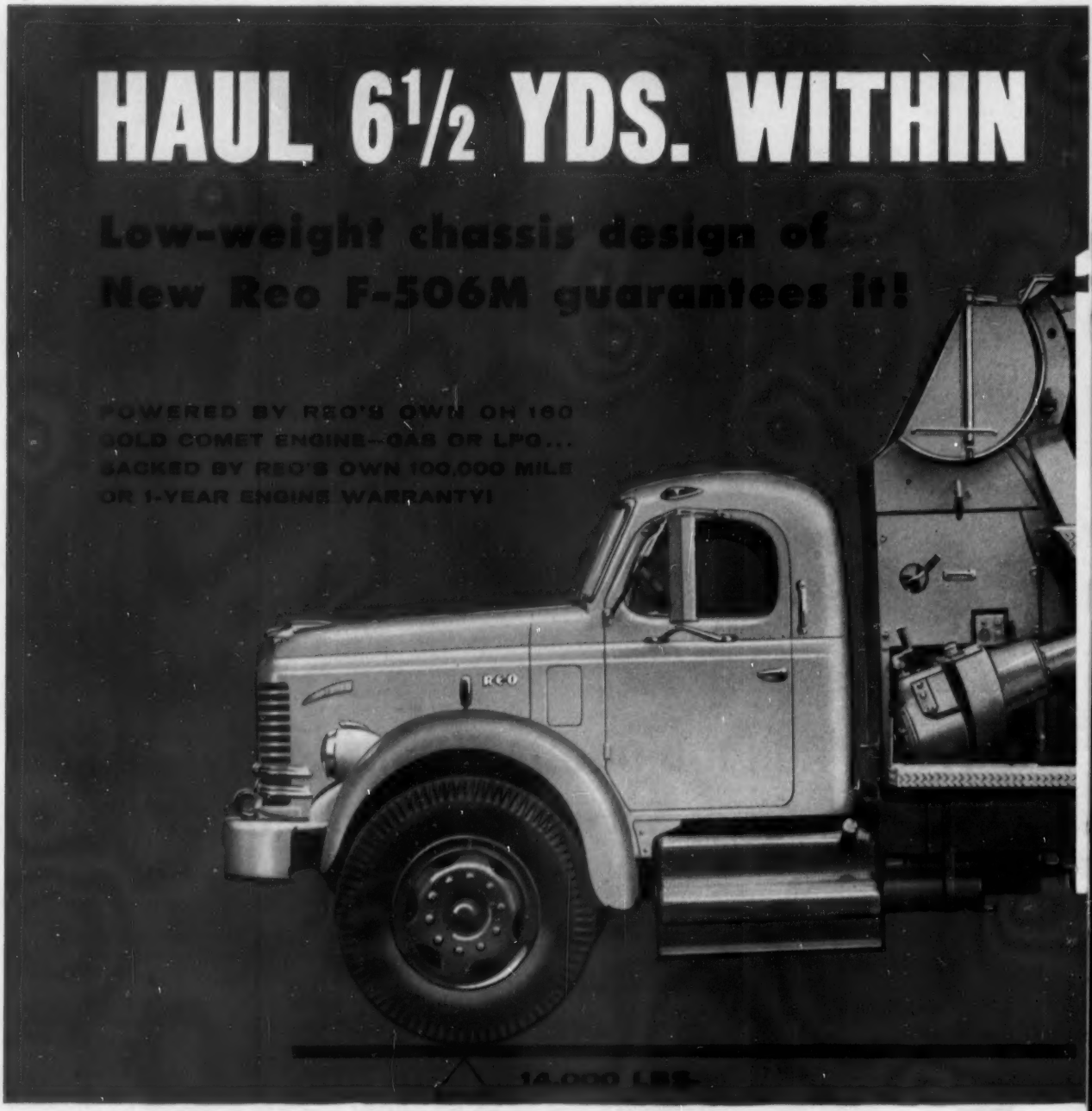
CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

HAUL 6½ YDS. WITHIN

Low-weight chassis design of New Reo F-506M guarantees it!

POWERED BY REO'S OWN 160 GOLD COMET ENGINE—GAS OR LP'G... BACKED BY REO'S OWN 100,000 MILE OR 1-YEAR ENGINE WARRANTY!



The certified chassis weight of Reo's new F-506M is 11,240 lbs. The official weighmaster's receipt proves how it can haul 6½ yds. of concrete and stay well within legal limits. The new Reo F-506M is designed and built specifically for mixer use. Its increased payload is made possible by Reo's new high-strength, low-weight *double-side-rail frame construction.*

The new Reo F-506M actually hauls up to 2 yards more than the average mixer chassis. And it places as much as 6,000 pounds more on the front axle than other conventional mixer trucks.

Reo full power steering, which is standard, makes maneuvering easy in tight places anywhere.

The new F-506M is powered by Reo's own 160 hp short-stroke, wet-sleeve Gold Comet Engine. Plenty of power for both truck and mixer. And, it's backed by Reo's famous *100,000 mile or one year warranty.*

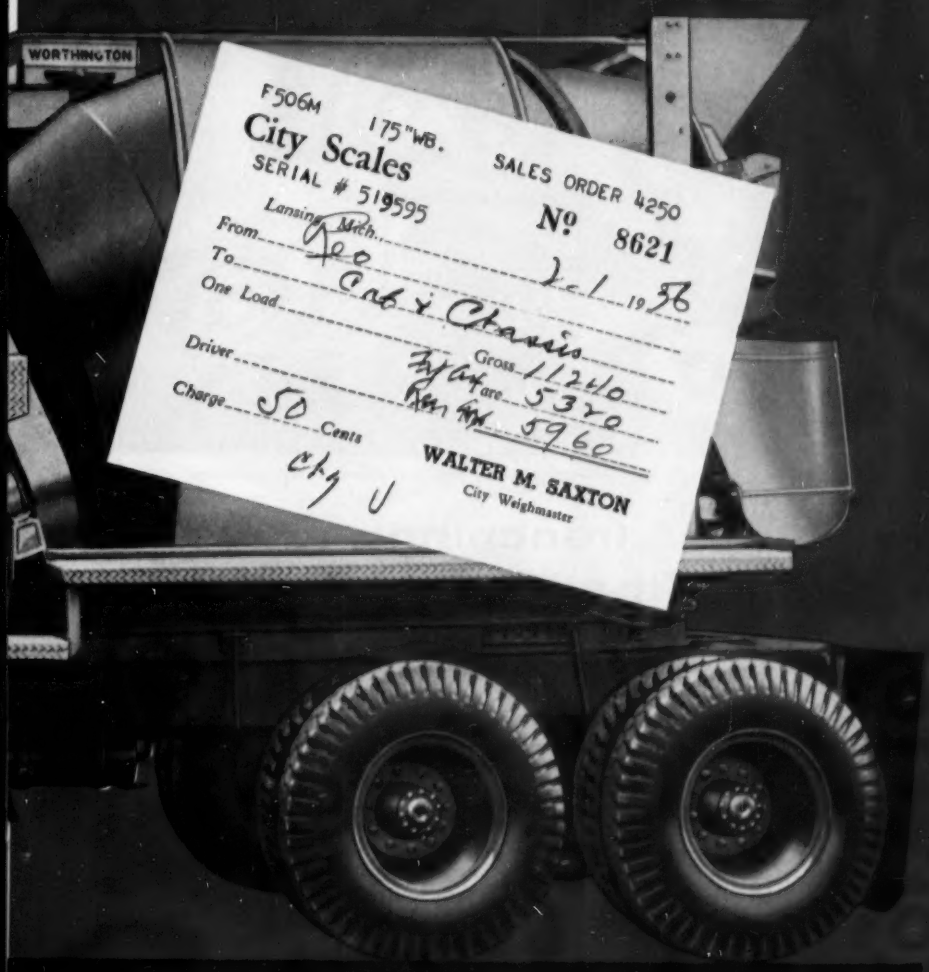
Reo's exclusive *front-axle-payload* design places more weight forward—giving you an extra 2 cubic yards of concrete every trip. With it, you can haul your regular daily volume with fewer trucks and drivers . . . or increase volume without increasing your fleet.

For states that permit greater axle loadings than 32,000 lbs., Reo builds the F-536M—52,000 lbs. G.V.W.

Additional hundreds of pounds can be added to the carrying capacity of the new Reo F-506M with Reo's optional front-end power take-off. The PTO also eliminates extra fuel and maintenance costs of the mixer's auxiliary power unit.

Call your Reo branch or distributor today and get the facts on the Reo that's right for you. Mail the coupon for full information.

32,000 lb. TANDEM LIMIT



REO

REO MOTORS, INC.
LANSING 20, MICHIGAN
SUBSIDIARY OF BOHN ALUMINUM AND BRASS CORPORATION

Please send at once:

☐ Complete Specifications on F-506M. ☐ Reo Front-End Power Take-off. ☐ New Tandem Catalog.

NAME _____

COMPANY _____

TITLE _____

ADDRESS _____

CITY _____ COUNTY _____ STATE _____

Model 705 Barber-Greene Runabout digs through toughest soils. High travel speed cuts time and cost of service trenching.

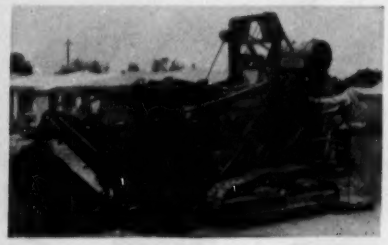
For lowest-cost trenching . . . choose the ditcher that's right for you

The first step in reducing ditching costs is to select the machine that meets your requirements. Ground conditions . . . digging range . . . job to job portability —all are factors that change with varying trenching operations. That's why Barber-Greene builds *four* distinctively different ditchers—each with special features that give it unsurpassed performance within its field.

Take the Model 705B Runabout for instance. Long a favorite for house service trenching, this versatile ditcher features the exclusive vertical boom that digs right up to obstacles leaving no ramp . . . Hydra-Crowd that gives finger-tip control of maximum crowding speeds independent of bucket line speed . . . and Fluid Coupling that eliminates shock loads.

Model 711 for widely scattered jobs. A 45 m.p.h. travel speed reduces between job time to a minimum. Digs to 5′ deep, and 18″ wide.

Model 702 for narrow trenches. A remarkably low-cost unit ideal for cable, conduit or small pipe. Digs 2¼″ to 5″ wide, to 40″ deep.



Model 44C for heavy-duty trenching. Crawler mounted for sure traction on soft bases, this Barber-Greene cuts to 8′ 3″ deep, and to 24″ wide.

56-4-D

Write for literature on any ditcher in the Barber-Greene line

Barber-Greene BG

AURORA, ILLINOIS, U.S.A.

CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT

GO with the ALL NEW 36 H. P.

Model
C-360
The BIG-JOB
Concrete Saw

Clipper® CONCRETE SAW C-360

No More Tilting or Lifting with AUTOMATIC "Retract-A-Turn"* WHEELS

"Retract-A-Turn"—another Clipper FIRST. Cuts line-up time in half! Dual Caster Wheels AUTOMATICALLY take over load when blade is raised out of the cut . . . lines up instantly in any direction **without lifting or tilting!** Lower blade into the cut . . caster wheels are automatically raised . . then you saw on 4 rubber-tired wheels . . giving you straight line cutting without drift to either side.

POSITIVE SCREW FEED provides instant positive control for raising and lowering the blade smoothly and easily. Protects blade. Insures longest cutting life.

FREE DEMONSTRATION on YOUR JOB!

Your CLIPPER Factory-Trained Representative Will Help You Select The Right Blade

DIAMOND BLADES for any job—any aggregate—every saw! Choose your Clipper Diamond Blade from a wide variety of specifications to cut green or old concrete with outstanding speed and economy. GREEN-CON BLADES give you savings as high as 80%—with completely new series of "Green-Con" Reinforced Abrasive Blades that let you cut "green concrete" with the widest possible range of HARD to SOFT Limestone Aggregates.

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Better Mail the Coupon NOW!

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- ☐ I want a FREE DEMONSTRATION of a Clipper Concrete Saw
- ☐ Send FREE literature on Clipper Masonry Saws and Blades
- ☐ Send FREE literature on Clipper Concrete Saws and Blades
- ☐ Have a Clipper factory trained representative call on me.

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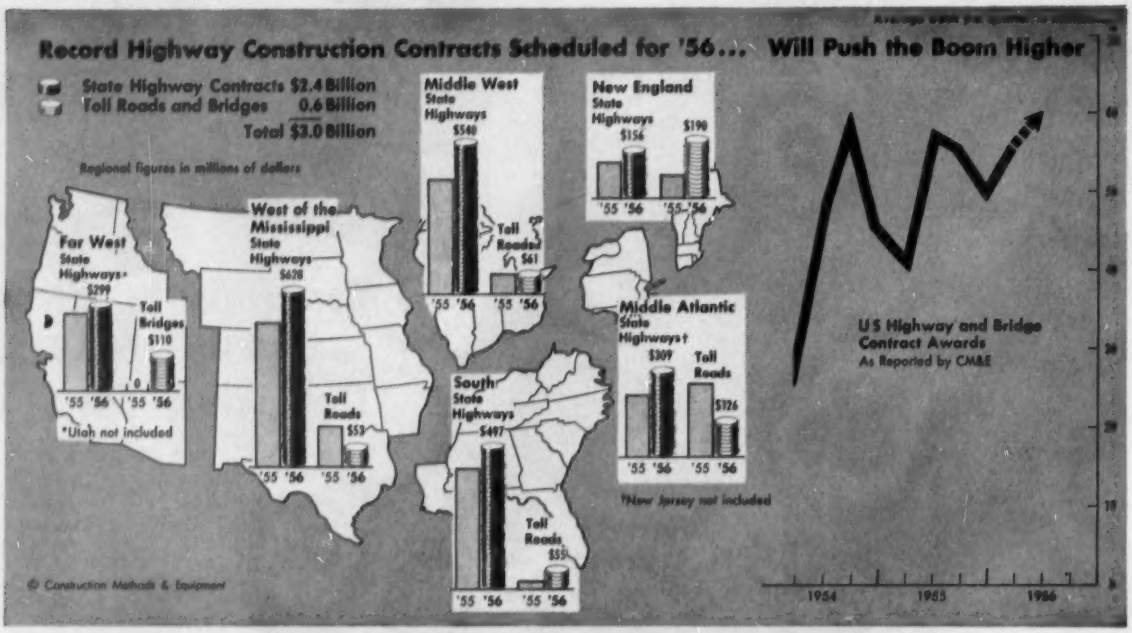
ADDRESS_____

CITY_____ STATE_____


Record Highway Construction Contracts Scheduled for '56... Will Push the Boom Higher
State Highway Contracts $2.4 Billion
Toll Roads and Bridges 0.6 Billion
Total $3.0 Billion
Regional figures in millions of dollars
Far West State Highways* $299
Toll Bridges $110
*Utah not included
West of the Mississippi State Highways $628
Toll Roads $53
Middle West State Highways $540
Toll Roads $61
New England State Highways $156
$190
Middle Atlantic State Highways† $309
Toll Roads $326
†New Jersey not included
South State Highways $497
Toll Roads $55
'55 '56
US Highway and Bridge Contract Awards
As Reported by CM&E
1954
1955
1956
© Construction Methods & Equipment

1956—Record Year for Road Builders

HIGHWAY CONTRACTORS are whistling a happy tune these days. The way new business has been surging ahead and the bright prospects for the rest of this year make sour notes strictly out of order.

Most contractors in the field already realize that 1956 will be the biggest year to date for highway awards (we told you so last November). CM&E's survey of state highway departments reveals an eye-popping 21% jump in construction contracts scheduled for this year. This is the sharpest year-to-year rise since 1953 when Korea emergency materials controls were killed. Highway contractors across the country face the rosy prospect of more than $2.4 billion in new lettings this year by 46 states and the District of Columbia. New Jersey and Utah will let contracts, too, but couldn't tell us how much. In addition to this new construction, the states also will increase contracts for maintenance by 12% to a new record of $64 million.

Contractors in all regions of the country will share in the 1956 highway boom. Thirty-nine states and D. C. will let more new work this year than last. In fact, only four states are budgeting less new construction this year than in 1955: Louisiana, Kentucky, Oregon, and Rhode Island. The Middle Atlantic states will set the 1956 pace with a 41% jump in state highway awards. Maryland, Delaware, and New York are planning very big increases. In other regions, awards will rise from 20% in New England to 9% in the Far West.

Contract maintenance will hit a new high this year with 27 states and D. C. planning to award $64 million in this type of work to highway contractors. Sharpest increases are due in the Far West where California and Oregon are upping maintenance contracts by 67% and 22%, respectively. All of the Midwestern states are increasing contract maintenance this year except Michigan which will spend at the same rate as last year. Michigan's planned spending of $14 million makes it the top state for contract maintenance again this year.

Toll Road Contracts Are Up, Too

On top of the surging volume of state highway business, contractors can count on $594 million in state toll road, turnpike, and toll bridge construction contracts this year. This is 2% more than last year's award total. Altogether, 1956 contract awards for state free and toll highway systems total more than $3 billion.

Nearly one-third of these toll road and turnpike awards will be by the Connecticut State Highway Department which plans to let $180 million in contracts for the Greenwich-Killingley Expressway. The New Jersey Turnpike Authority and the Pennsylvania Turnpike Commission will let about $50 million each in awards this year. The balance will be awarded by agencies in 12 other states, (see table.)

States To Spend 17% More For New Highway Equipment

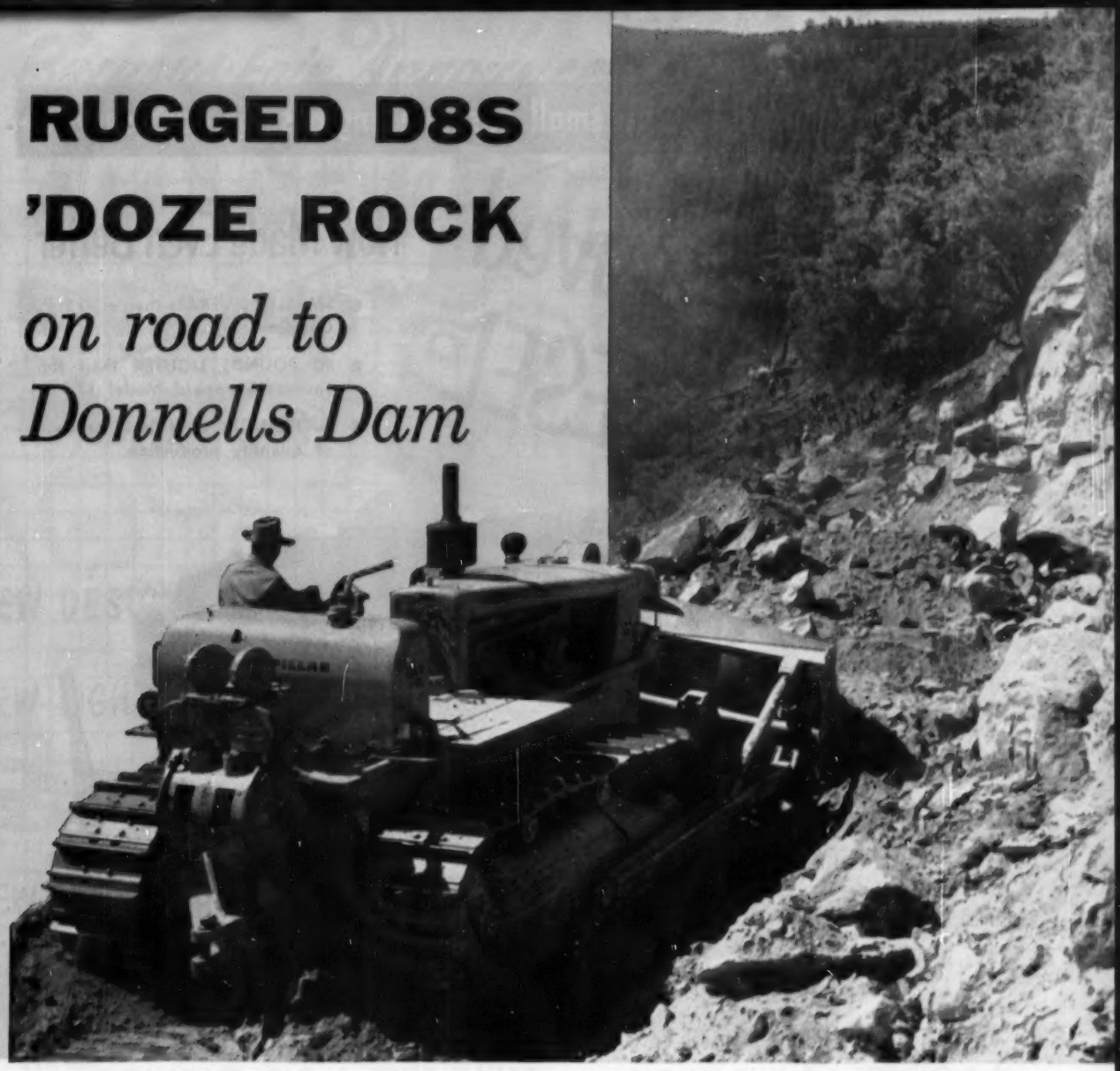
State highway departments will spend more this year for new construction equipment than ever before. They plan to buy $43 million worth, 17% more than last year.

The trend of equipment buying will be up in all regions with the sharpest increases in New England,

(Continued on page 35)

RUGGED D8S 'DOZE ROCK

on road to Donnells Dam



In rough mountain country above Strawberry, California, Tri-Dam Constructors are preparing for the $32,000,000 job of building Donnells Dam.

One of the first requirements is an 8-mile, 24-foot contour road leading up to the dam site and permanent camp. And most of the roadway has to be blasted out of steep granite slopes like the one pictured. Handling shot rock on locations like this takes tough equipment. That's why Tri-Dam is using CAT* D8 Tractors with No. 8S Bulldozers. There are 9 of them working on the project.

The D8 has been known as "king of the crawlers" for years. As jobs grew bigger and tougher, the tractor has grown with them. Today's D8 is new from the ground up—bigger, tougher, more powerful than any earlier model. Look at these features;

- *New heavy-duty 4-cycle diesel engine delivering 191 HP at 1200 RPM.*
- *Choice of torque converter or direct drive.*
- *Oil clutch, for smooth performance and long work life.*
- *New 7-roller track frame and long-wearing "water quenched" track shoes.*
- *New, more powerful starting engine with "in-seat" starting.*
- *Better job visibility and greater operator comfort.*

Your Caterpillar Dealer will be glad to show you how this new D8 can increase your production. And you can depend on him for prompt service and original parts. Ask him for a demonstration today.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

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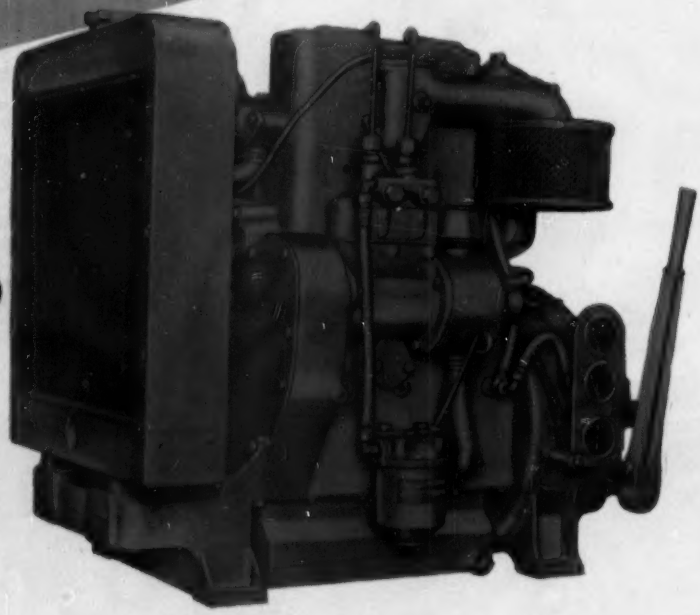
NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

Why "monkey around" with small gasoline engines for hard service

Here's a proved 20h.p. DIESEL

Now Made Even Better

- **SMALLER OVERALL** than a 20 H.P. Gasoline Engine
- **50 POUNDS LIGHTER** than the Famous Sheppard Model 17
- **SUPRISINGLY LOW COST** because of quantity production



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- **2 CYLINDERS • 3 MAIN BEARINGS**
- **22 TO 1 COMPRESSION RATIO**
- **SIMPLIFIED SHEPPARD FUEL SYSTEM**
- **OIL-COOLED PISTONS**

BUILT LIKE A BIG ENGINE TO STAY ON THE JOB

The New Sheppard Model 17A Diesel offers 20 H.P. gasoline engine users escape from the high cost of constant maintenance and frequent replacement. It provides equipment manufacturers with interchangeable Diesel power to offer as optional for heavy-duty service. In either case no special engineering or design changes are necessary for installation of the Model 17A.

Small gasoline engines have their place. It is not in heavy-duty service. It costs money to monkey around with one on a job it's not built for. In the long run, a Sheppard Model 17A more than pays for itself. Write for complete information and specifications on this amazing new Sheppard Diesel today.

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Send me complete information on the New Sheppard Model 17A Power Units ☐ Generating Sets ☐

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I am a: Power User ☐ Equipment Manufacturer ☐

Available as 5 or 7½ K.W. Generating Sets

MAIL COUPON FOR FREE MODEL 17A LITERATURE

Bucyrus-Erie Announces

ALL-NEW DRAGLINE BUCKETS

Three types available — light, medium, and heavy. Offered with either solid or perforated baskets.

NEW DESIGN!

NEW LIGHT WEIGHT!

NEW HIGH OUTPUT!

A line of dragline buckets designed and built to set new high standards of performance — that's what Bucyrus-Erie now offers you. These new buckets include such high-production design features as:

1. "Slicing action" lip to penetrate material quickly and easily.
2. Tapered basket scientifically shaped to load full and fast.
3. Proper flaring and balance to minimize bobbing and spillage.
4. Smooth inside design and high arch for fast, clean dumping.

Along with outstanding design features, Bucyrus-Erie developed BECOLOY, a special steel alloy with a tough, fibrous structure that is especially suited to this type of service.

These new dragline buckets are built to introduce a new standard of performance — add new efficiency to your dragline operations. See your Bucyrus-Erie distributor soon for complete information — he is well qualified to help you select the right size and type for your job.

BUCYRUS ERIE

BUCYRUS-ERIE COMPANY

South Milwaukee, Wisconsin

SEND FOR FREE BULLETIN!

Gentlemen: Please send me a copy of your new dragline bucket bulletin.

Name _____

Company _____

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10R56C

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When it's a question of wire rope, the place to go is to your Wickwire Rope distributor. He knows your requirements. He knows wire rope and how it can be used to best advantage. In addition, he can provide you with this important extra—the technical assistance of Wickwire Sales Engineers. With the additional help of these capable specialists, he can give you expert, practical advice on even the toughest wire rope problems.

Your Wickwire Rope distributor is a good man to know. He's quality people handling quality products. Buy your wire rope and wire rope slings from him. You'll find that the many valuable services he offers far outweigh any apparent price advantage you might gain by buying direct.

CF&I WICKWIRE ROPE A CF&I PRODUCT

A PRODUCT OF THE COLORADO FUEL AND IRON CORPORATION

3150

Continued from page 30

41%, and in the Middle Atlantic, 39%. Pennsylvania has the biggest equipment budget $4.4 million, up a whopping 76% over last year. However, the South stands out as the biggest regional customer of equipment makers this year with plans to pay out $12 million, 5% more than in 1955. The West of the Mississippi is second highest with $10 million, a 9% increase, even though 7 of the 13 states in the area plan to cut back equipment spending slightly. Texas is the big purchaser in this region with $3.5 million planned, 9% above 1955. The table shows how much each state highway department plans to spend this year for construction equipment compared with last year.

Toll road and turnpike authorities will add another $1.5 million to state equipment purchases this year. This is up 41% over last year's budgets. The Kansas Turnpike Authority plans to buy $1 million worth, and the Florida State Turnpike Authority, the New Jersey Highway Authority, and the Maine Turnpike Authority have budgeted $100,000 to $160,000 each.

Look Out for Materials Shortages

There are materials bottlenecks which threaten to delay highway contracting schedules this year. Alert contractors will take these into account when bidding. Completion schedules and costs can be thrown out of whack by slow materials deliveries or by contractors having to go outside normal supply areas to purchase materials.

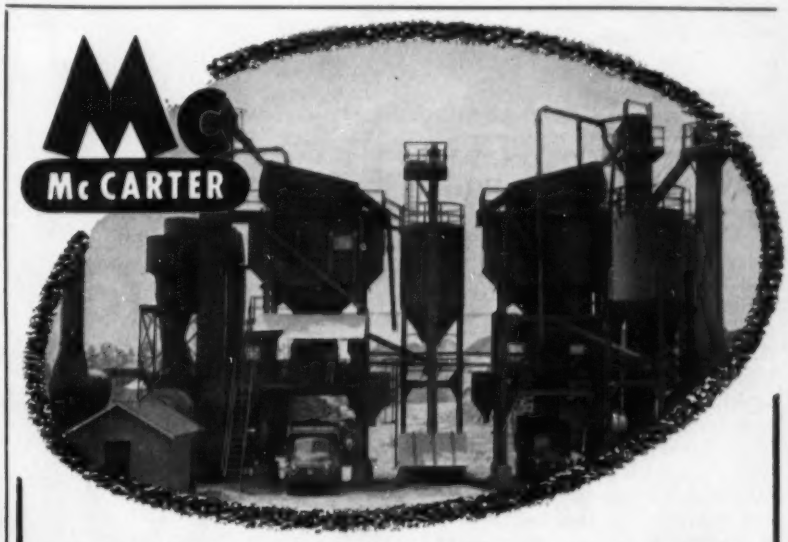
The critical item is structural steel. Deliveries on new orders take up to a year or more. This makes it a must to plan bridge construction schedules and order steel far in advance so it will be on hand when needed. Three out of four state highway departments expect the structural steel shortage will seriously affect this year's contracting schedules.

Reinforcing bars are less of a problem than structurals, but even so they're coming through slowly in some parts of the country. The bar picture is serious in New York, Maryland, and Vermont. The rest of the states are evenly divided among those who expect slight shortages of bars and those seeing no problem in getting bars on schedule this year.

A serious cement shortage is seen in four states: Tennessee, Delaware, Vermont, and Rhode Island. Another 23 states, including all of the Midwestern states, expect a slight cement problem. However, none of the Far Western state highway departments looks for a cement bottleneck.

Contractors should watch the cement supply picture closely, getting commitments as early as possible. All types of heavy construction are booming this year, and a record amount of concrete will be poured. Though cement makers are expanding, there's some doubt that production will catch up with demand until early next year—if then. The way construction is booming (1956 contracts are 32% ahead of last year) it's getting

(Continued on next page)



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20 years experience in design and manufacture of this truly balanced equipment, assures McCarter customers of standardized parts and minimum costs.

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DRYERS (hot or hot & cold material, center outlet type) • MIXERS • ASPHALT BUCKETS (Steam, hot oil or electric heated) • AGGREGATE HOPPERS • BINS • APRON TYPE FEEDERS • CYCLONE COLLECTORS • ELEVATORS • STEEL STRUCTURES

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IT'S YOUR BUSINESS...

Continued from page 35

harder to close the gap between demand for cement and supply.

Several state highway departments are figuring on stretching out completion schedules on some jobs let this year because of tight materials supplies and slow deliveries. These states include Oregon, Wisconsin, Michigan, Ohio, West Virginia, New York, and Rhode Island.

Another way in which states are trying to minimize the effects of the steel shortage is by asking for alternate bids on reinforced or prestressed concrete or by redesigning away from steel to concrete on bridges.

SOME BIG CONTRACT AWARDS OF THE MONTH

Koppers Co., Inc., (Engineering and Construction Div.,) Koppers Bldg., Pittsburgh 19, Pa. Design and construct open hearth shop with seven 350-ton open hearth furnaces and auxiliary equipment soaking pit shop with 16 pits of regenerative type adaptable to blast furnace gas firing, slabbing mill shop with 45x90-in. universal mill and all transportation, utility and related facilities for these installations at Sparrows Point, Md. for Bethlehem Steel Corp., Bethlehem, Pa. $200,000,000.

Morrison-Knudsen Co., 319 Broadway, Boise, Idaho. Fill work for replacing trestle over Great Salt Lake, Utah. Southern Pacific R.R. Co., 65 Market St., San Francisco 5, Calif. $45,000,000.

Bechtel International Corp., 220 Bush St., San Francisco, Calif. Alumina plant at LaQuinta between Ingleside and Gregory, near Corpus Christie, Tex., for Reynolds Metals Co., 3 and Grace St., Richmond, Va. $30,000,000.

The Austin Co., 16112 Euclid Ave., Cleveland 12, Ohio. Design and construct four rein.,-con., steel 1,021,000-sq ft development center buildings, Seattle, Wash. for Boeing Airplane Co., 7755 E. Marginal Way, Seattle, Wash. $21,000,000.

The Flour Corp., Ltd., 2500 S. Atlantic Blvd., Los Angeles, Calif. Plastics plant at Baton Rouge, La.

(Continued on page 268)

State Highway Contracts Scheduled for 1956

Reported by State Highway Departments

State and Region	New Construction 1956 (Thous.)	New Construction % Change 1955-1956	Contract Maintenance 1956 (Thous.)	Contract Maintenance % Change 1955-1956
U. S. Total	**$2,429,001**	**+21**	**$63,839**	**+12**
New England	**155,800**	**+20**	**2,950**	**— 5**
Maine	$14,000	+ 8	...	...
New Hampshire	7,800	+ 5	500	0
Vermont	6,000	+ 8	150	—50
Massachusetts	80,000	0	2,000	0
Rhode Island	8,000	—47	...	...
Connecticut	40,000	+344	300	0
Middle Atlantic	**309,100**	**+40**	**950**	**+10**
New York	100,000	+32	...	...
New Jersey	...	...	...	...
Pennsylvania	111,000	+ 4	...	...
Maryland	79,600	+172	...	...
District of Columbia	6,000	+ 2	700	+ 3
Delaware	12,500	+184	250	+36
South	**497,000**	**+15**	**15,000**	**+14**
Virginia	30,000	+61	6,000	+20
West Virginia	25,000	+92	4,000	+33
North Carolina	40,000	+ 3	...	...
South Carolina	30,000	+25	...	...
Georgia	70,000	+40	...	...
Florida	87,500	+46	...	...
Alabama	67,500	+69	...	...
Mississippi	26,000	+38	...	...
Louisiana	52,000	—42	2,000	0
Kentucky	39,000	—11	3,000	— 7
Tennessee	30,000	+ 3	...	...
Middle West	**540,000**	**+28**	**26,809**	**+ 5**
Ohio	200,000	+ 8	8,000	+ 7
Indiana	33,000	+56	750	+25
Illinois	94,000	+17	3,500	+20
Wisconsin	86,000	+43	559	+ 6
Michigan	127,000	+73	14,000	0
West of the Miss.	**628,300**	**+19**	**10,420**	**+ 3**
Minnesota	50,000	+25	4,170	+17
Iowa	60,000	+30	...	...
Missouri	75,000	+25	...	...
Arkansas	29,000	+24	...	...
North Dakota	15,000	0	1,000	+279
South Dakota	26,000	+20	200	—88
Nebraska	22,500	+ 7	1,000	0
Kansas	41,000	0	2,800	+16
Oklahoma	48,000	+50	...	...
Texas	174,300	+ 8	...	...
Montana	23,000	+21	700	+17
Wyoming	12,000	+15	50	—47
Colorado	34,500	+58	...	...
New Mexico	18,000	+27	500	0
Far West	**298,801**	**+ 9**	**7,710**	**+87**
Idaho	18,805	+65	2,500	+2055
Utah	...	...	...	...
Arizona	18,000	+ 8	750	+21
Nevada	15,000	+67	...	...
Washington	45,000	+45	1,000	0
Oregon	25,000	—17	1,460	+22
California	176,996	+ 1	2,000	+67

1956 Toll Road Contracts Planned

Reported by toll road and turnpike agencies and state highway departments

	New Construction Actual 1955 (Thousands)	New Construction Planned 1956 (Thousands)	New Construction Percentage Change
U. S. Total	**$585,386**	**$594,477**	**+ 2**
By Toll and Turnpike Authorities	**427,486**	**364,773**	**—15**
California Toll Bridge Authority	...	68,000	...
Florida State Turnpike Authority	22,941	35,000	+341
Illinois Toll Highway Commission	...	60,597	...
Indiana Toll Road Commission	71,120	0	—100
Kansas Turnpike Authority	104,000	2,500	—98
Maine Turnpike Authority	1,970	1,000	—49
New Jersey Turnpike Authority	64,700	50,000	—23
New Jersey Highway Authority	3,275	10,000	+205
New York State Thruway Authority	43,000	0	—100
Oklahoma Turnpike Authority	30,356	12,000	—60
Pennsylvania Turnpike Commission	72,000	52,000	—28
Texas Turnpike Authority	13,524	38,476	+185
Richmond-Petersburg Turnpike Auth. (Va.)	100	20,000	+19900
Washington Toll Bridge Authority	0	15,000	...
West Virginia Turnpike Commission	500	200	—60
By State Highway Departments	**157,900**	**229,704**	**+45**
California (Carquinez Bridge Project)	0	26,704	...
Connecticut	68,900	180,000	+161
New Hampshire	9,000	9,000	0
Maryland	80,000	14,000	—82

PROLONGED CONFINEMENT COUNTS

...when it comes to best breakage

Contractor needs good breakage and control on this road grading shot. Job calls for careful attention to loading and spacing . . . and ROCKMASTER method of bottom initiation to prolong confinement of blast.

105 holes . . . 10 ft. spacing. Each hole loaded with a ROCKMASTER electric blasting cap and 40 lbs. of Atlas 40% Extra Dynamite. At height of blast, note fine fracture and control.

Prolonged confinement pays off! No wild flying boulders. Basalt rock just "heaved" up and broken. Excellent fragmentation. Contractor has well placed pile, bite size, ready for removal.

PROLONGED CONFINEMENT—the Rockmaster® way

There's nothing like a combination of Atlas 40% Extra Dynamite and a ROCKMASTER pattern . . . when it comes to economical, controlled blasting. A medium velocity ammonia dynamite, with properly chosen millisecond delays it gives good heaving, stressing action, allowing maximum breakage and control.

On this road grading job at Roseburg, Ore., D & H Construction Co. and M. H. Hassler, contractors, gained *prolonged confinement* by keeping explosives force working *underneath* the burden . . . lifting it . . . breaking it up thoroughly. The right combination of ROCKMASTER millisecond delay electric blasting caps and Atlas explosives produced—

- **good control**
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- **better public relations**

Before your next blast, why not go over your specific problems with your Atlas representative? He'll help you get the most out of the ROCKMASTER method, your caps, and your explosives. And get "Better Blasting"—Atlas' informative newsletter on latest methods and materials. Write us to put your name on our mailing list today.

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Here's How...

Federal Aid For Highways Shapes Up

(in thousands of dollars)

THE SENATE this month begins study of the most massive peacetime public works program in history—the 13-year, $51 billion highway construction program voted last month by the House of Representatives.

Prospects for favorable Senate action on the bill are considered excellent. Its passage would make available $37.6 billion of federal money—about three times the current rate—over the 13 years.

The bill passed by the House provides for a federal contribution of $24.8 billion to improve the 40,000-mile interstate highway system during the next 13 years. This federal investment would represent about 90% of the total cost; state contributions would add an additional $2 billion, making the total program $27 billion.

The bill also authorizes federal contributions—to be matched 50-50 by the states—for primary, secondary, and urban highways through 1959. It makes no authorization for these road systems beyond 1959, but the intent of Congress is that federal funds for these highways should be increased $25 million per year to an annual total of $1 billion in 1969.

The accompanying table shows the breakdown of federal aid funds by states and by highway systems. Funds for 1957 primary, secondary, and urban systems are in addition to federal aid already authorized and apportioned under existing law.

The table was prepared by the American Road Builders' Association from data compiled by the Bureau of Public Roads, U.S. Department of Commerce.

	*1957			
States	($11,250) Primary	($7,500) Secondary	($6,250) Urban	($25,000) Total
Alabama	$239	$186	$82	$507
Arizona	172	117	24	313
Arkansas	191	153	35	379
California	531	274	559	1,364
Colorado	213	142	52	407
Connecticut	74	38	122	234
Delaware	56	38	13	107
Florida	186	121	113	420
Georgia	279	214	92	585
Idaho	142	100	12	254
Illinois	442	241	440	1,123
Indiana	268	185	150	603
Iowa	273	200	75	548
Kansas	272	191	59	522
Kentucky	213	176	65	454
Louisiana	181	131	92	404
Maine	96	68	26	190
Maryland	104	63	107	274
Massachusetts	148	55	262	465
Michigan	356	217	293	866
Minnesota	295	208	102	605
Mississippi	202	169	35	406
Missouri	328	222	155	705
Montana	237	163	15	415
Nebraska	228	161	37	426
Nevada	150	100	5	255
New Hampshire	56	38	19	113
New Jersey	150	51	275	476
New Mexico	187	129	21	337
New York	543	219	840	1,602
North Carolina	285	243	81	609
North Dakota	164	119	11	294
Ohio	399	243	364	1,006
Oklahoma	243	174	69	486
Oregon	197	137	50	384
Pennsylvania	461	275	476	1,212
Rhode Island	56	38	45	139
South Carolina	152	126	43	321
South Dakota	175	125	12	312
Tennessee	247	198	91	531
Texas	744	498	301	1,543
Utah	134	88	27	249
Vermont	56	38	10	104
Virginia	220	171	98	489
Washington	192	128	95	415
West Virginia	126	109	41	276
Wisconsin	268	187	123	578
Wyoming	148	100	7	255
District of Columbia	56	38	54	148
Hawaii	56	38	21	115
Puerto Rico	59	62	54	175

1958				1959				Interstate funds, fiscal years 1957-69 incl. ($24,825,000)	Grand Total ($26,375,000)
($337,500) Primary	($225,000) Secondary	($187,500) Urban	($750,000) Total	($348,750) Primary	($232,500) Secondary	($193,750) Urban	($775,000) Total		
$7,035	$5,470	$2,422	$14,927	$7,269	$5,652	$2,503	$15,424	$389,752	$420,610
5,060	3,446	719	9,225	5,229	3,561	743	9,533	223,425	242,496
5,611	4,492	1,034	11,137	5,798	4,642	1,069	11,509	215,977	239,002
15,623	8,064	16,434	40,121	16,144	8,333	16,982	41,459	2,477,535	2,560,479
6,250	4,174	1,537	11,961	6,458	4,313	1,588	12,359	166,327	191,054
2,184	1,102	3,581	6,867	2,257	1,139	3,700	7,096	593,317	607,514
1,654	1,102	379	3,135	1,709	1,139	392	3,240	69,510	75,992
5,454	3,565	3,315	12,334	5,636	3,684	3,426	12,746	528,772	554,272
8,210	6,284	2,694	17,188	8,484	6,494	2,784	17,762	747,232	782,767
4,184	2,942	356	7,482	4,323	3,040	368	7,731	114,195	129,662
13,006	7,083	12,930	33,019	13,439	7,319	13,361	34,119	1,136,985	1,205,246
7,871	5,429	4,423	17,723	8,134	5,610	4,570	18,314	925,972	962,612
8,021	5,878	2,195	16,094	8,288	6,074	2,268	16,630	295,417	328,689
8,000	5,608	1,738	15,346	8,267	5,795	1,796	15,858	220,942	252,668
6,251	5,184	1,920	13,355	6,459	5,357	1,984	13,800	526,290	553,899
5,310	3,840	2,710	11,860	5,487	3,968	2,800	12,255	526,290	550,809
2,813	2,014	773	5,600	2,907	2,081	798	5,786	156,397	167,973
3,046	1,866	3,138	8,050	3,148	1,929	3,242	8,319	464,227	480,870
4,347	1,632	7,695	13,674	4,492	1,686	7,952	14,130	893,700	921,969
10,478	6,394	8,605	25,477	10,828	6,607	8,892	26,327	1,382,752	1,435,422
8,656	6,114	3,011	17,781	8,944	6,318	3,111	18,373	516,360	553,119
5,929	4,956	1,024	1,909	6,126	5,121	1,058	12,305	263,145	287,765
9,644	6,528	4,553	20,725	9,966	6,745	4,705	21,416	638,002	680,848
6,972	4,792	435	12,199	7,205	4,951	450	12,606	163,845	189,065
6,695	4,742	1,084	12,521	6,918	4,900	1,120	12,938	114,195	140,080
4,396	2,938	141	7,475	4,542	3,036	145	7,723	79,440	94,893
1,654	1,102	547	3,303	1,709	1,139	566	3,414	71,992	78,822
4,411	1,500	8,093	14,004	4,558	1,550	8,363	14,471	1,449,780	1,478,731
5,509	3,784	607	9,900	5,693	3,910	627	10,230	250,732	271,199
15,974	6,431	24,712	47,117	16,507	6,645	25,536	48,688	1,427,438	1,524,845
8,374	7,151	2,376	17,901	8,653	7,390	2,455	18,498	263,145	300,153
4,819	3,504	313	8,636	4,979	3,620	323	8,922	114,195	132,047
11,741	7,140	10,699	29,580	12,132	7,378	11,055	30,565	1,452,263	1,513,414
7,153	5,126	2,020	14,299	7,392	5,297	2,087	14,776	402,165	431,726
5,783	4,041	1,482	11,306	5,976	4,176	1,532	11,684	340,103	363,477
13,563	8,094	13,996	35,653	14,015	8,363	14,463	36,841	811,778	885,484
1,654	1,102	1,322	4,078	1,709	1,139	1,366	4,214	131,573	140,004
4,469	3,713	1,272	9,454	4,618	3,837	1,314	9,769	196,118	215,662
5,143	3,680	359	9,182	5,315	3,802	371	9,488	101,783	120,765
7,263	5,666	2,673	15,602	7,505	5,855	2,763	16,123	404,646	436,904
21,862	14,639	8,857	45,358	22,590	15,127	9,152	46,869	930,938	1,024,708
3,932	2,602	783	7,317	4,063	2,689	810	7,562	253,215	268,343
1,654	1,102	288	3,044	1,709	1,139	297	3,145	188,670	194,963
6,457	5,013	2,883	14,353	6,672	5,180	2,979	14,831	608,213	637,886
5,646	3,772	2,790	12,208	5,834	3,897	2,883	12,614	498,983	524,220
3,691	3,211	1,203	8,105	3,814	3,318	1,243	8,375	275,558	292,314
7,883	5,503	3,620	17,006	8,146	5,687	3,741	17,574	345,068	380,226
4,363	2,955	201	7,519	4,508	3,053	208	7,769	315,278	330,821
1,654	1,102	1,597	4,353	1,709	1,139	1,650	4,498	161,363	170,362
1,654	1,102	622	3,378	1,709	1,139	642	3,490		6,983
1,744	1,826	1,589	5,159	1,803	1,887	1,642	5,332		10,666

(Advertisement)

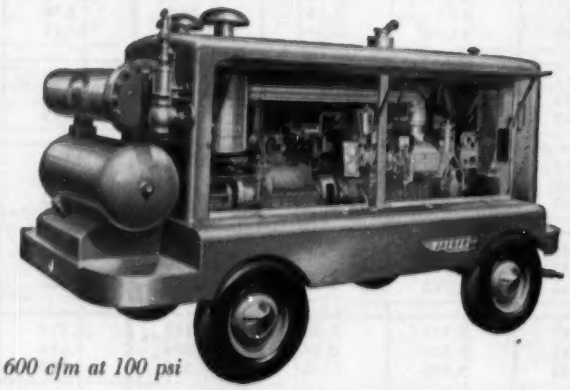
TO MINIMIZE TRAFFIC INTERFERENCE on busy Belmont Boulevard, two cuts at a time are being made on long job of replacing clamps on Nashville, Tenn. gas mains. The cuts (30″ sq. and 26″ average depth) are backfilled immediately with hot mix tamp. The compressor used is a Jaeger Air-Plus Roto® "125" because it has the capacity to run both breakers at full efficiency yet is easily trailed and light enough to spot by hand.

BACKFILLING 7 MILES OF TRENCH, A. J. Ellis Construction Co., College Park, Md. are here using a Jaeger Roto "125" with a triplex tamper. Job is laying 35,000′ of 24″ gas transmission line for Washington Gas Light Co. User reports: "We liked our first Jaeger Rotary so well we bought two more."

Jaeger 125 Rotary speeds your street work

With a Jaeger 125 "Roto" you have *constant* 100 lbs. pressure under all air demands up to 125 cfm—enough to run two 80 lb. breakers at top efficiency. You have tool boxes that hold a full set of tools. You have a machine that's easier to trail and spots by hand. And you have the most efficient rotary compressor unit built, producing air at slower engine speeds, low temperatures and with fuel economy that is money in the user's pocket.

Jaeger Rotaries are also available in 365 and 600 cfm sizes, for larger work. For complete information or demonstration, see your Jaeger distributor — or send for latest Catalog JCR5.



Model "600" Air-Plus Roto — 600 c/m at 100 psi

THE JAEGER MACHINE COMPANY

800 Dublin Avenue, Columbus 16, Ohio

PUMPS • MIXERS • TRUCK MIXERS • SPREADERS • FINISHERS • LOADERS

PICTURE OF THE MONTH
CONSTRUCTION METHODS AND EQUIPMENT

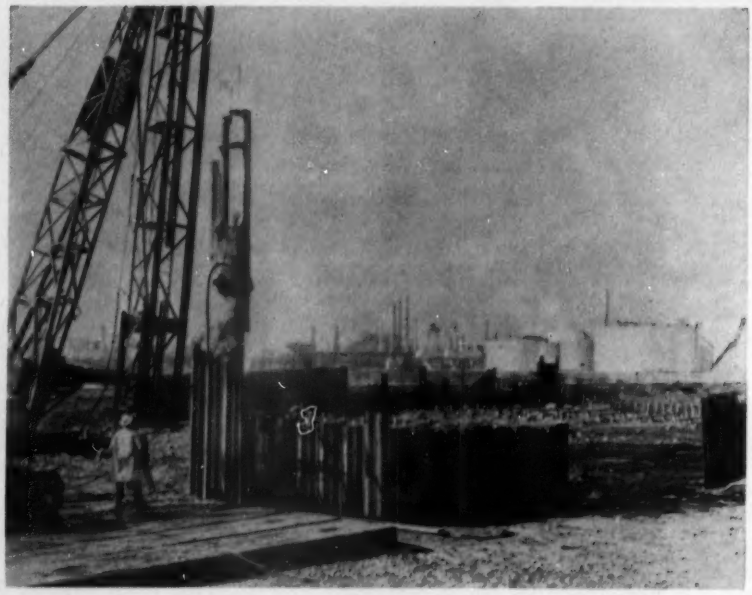
Trucks Pour Pier

● Trucks chute concrete directly into tremies to pour a 2,710-cu yd seal for a Willamette River bridge pier in Portland, Ore. Manson Construction & Engineering Co. of Seattle built a ramp to the edge of the cofferdam so trucks could roll within chuting distance. Manson completed the pour in 20 hours with average production of 135 cu yd an hour. Later pours for the $1.9 million Morrison Street Bridge will require a 125-ft trestle with a T-shaped dock to accommodate three trucks.

Construction News in Pictures . . .

Steel-Ribbed Dome

A 270-ft dia dome nears completion on the campus of Georgia Institute of Technology in Atlanta. Porex wood-chip concrete roof panels are placed over a framework of bulb tees and coated with grout. Steel ribs were erected by framing into a ring girder supported by a steel column.



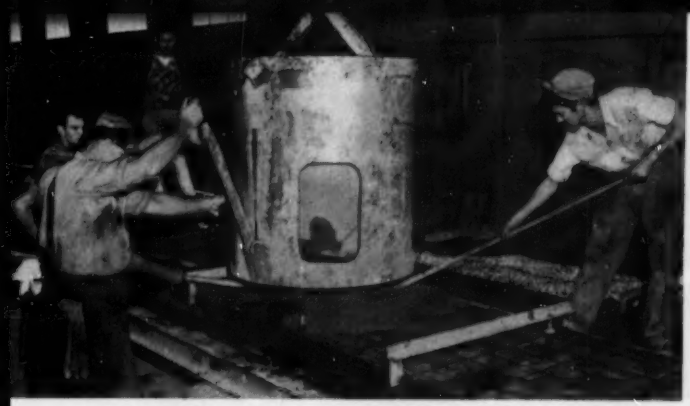
Dry Land Cofferdam

To provide a dry hole for a 12-ft deep concrete separator at Tide Water Associated Oil Co.'s Avon Refinery at Associated, Calif., Bechtel Corp. drove 600 tons of steel sheet piling through mud and closely packed clay. L. B. Foster Co., Los Angeles, supplied the piling, and Raymond Concrete Pile Co. placed it with a crawler rig mounting a McKiernan-Terry #9 hammer.

Shoveling Pipe

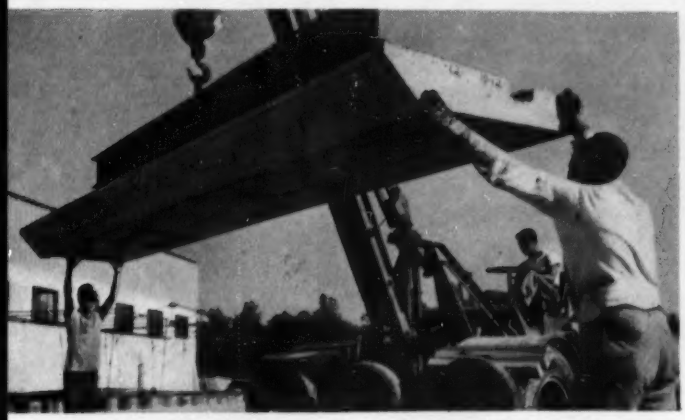
Contractor on the $8 million Information Center Building at Williamsburg, Va., devised a handy method for moving 30-in. concrete drainage pipe quickly and efficiently about the 60-acre site. He bolted 36-in. forks to the bucket of an International Drott TD-14 Skid-Shovel to move the 5,000 lineal ft of pipe that will be placed for the building.

(Continued on page 45)

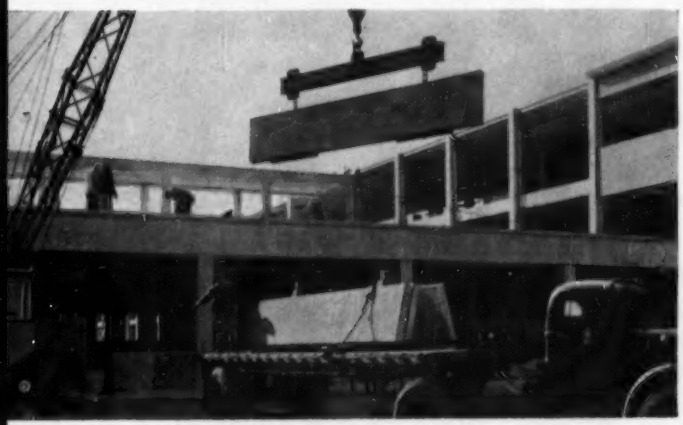


▲ Placing concrete made with Lehigh Early Strength Cement for one of the 1100 precast insulated wall panels required for this job. All panels were cast at Marietta Concrete Corp. plant.

▲ Removing panel from form just one day after being poured . . . ⅓ the usual time. Wall panels vary in size from 2′ 2″ x 2′ 3″ to 18′ 5″ x 6′ 6″.



▲ In addition to the wall panels, the job required 260 pieces of precast coping . . . also made with Lehigh Early Strength Cement. The average piece is 3′ wide x 18′ long x 12″ thick.



▲ Wall panels being erected at job site. An exposed aggregate finish was placed on the surface for architectural effect after panels were removed from forms.

PRECAST CONCRETE PANELS
made with
Lehigh Early Strength Cement
FOR WORLD'S LARGEST BUILDING OF CONCRETE PANEL CONSTRUCTION

The use of Lehigh Early Strength Cement in the precast wall panels and coping for the National Security Administration Building at Fort Meade, Md., permitted form removal in ⅓ the usual time—cut form costs by ⅔. This, the world's largest building of concrete panel construction, offers further proof that somewhere on nearly every job Lehigh Early Strength Cement will save time and money.

Manufacturer of precast insulated panels—Marietta Concrete Corp., Rossville, Md.; General Contractor—a joint venture consisting of Chas. H. Tompkins Co., Washington, D.C. and J. A. Jones Construction Co., Charlotte, N. C.; Ready Mix Concrete for panels supplied by Harry T. Campbell Sons Corp., Towson, Md.; Supervision by U.S. Army Corps of Engineers.

LEHIGH PORTLAND CEMENT COMPANY
Allentown, Pa.

- **Lehigh Early Strength Cement**
- **Lehigh Portland Cement**
- **Lehigh Air-Entraining Cement**
- **Lehigh Mortar Cement**

Two wings of building, showing panels and coping in place. It contains 1,400,000 sq. ft. of floor space and is the largest building of precast insulated panel construction in the world. ▼

you name it . . . we've got it!

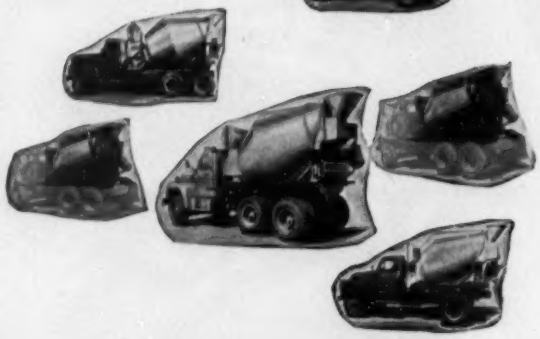
No matter what kind of truck mixer you need, you'll find *exactly* the right model and size in the T. L. Smith line — the world's most complete family of mixers.

You not only have a choice of 31 different types and sizes — you can have *more than five hundred different accessory options!**

This means that you can actually have a "custom-tailored" mixer built to your particular requirements — *and you can get it without paying a premium for custom manufacturing.*

Sizes and types are shown at the right.

* Write for details on accessory options available for the size and type mixer you need. *No obligation.*

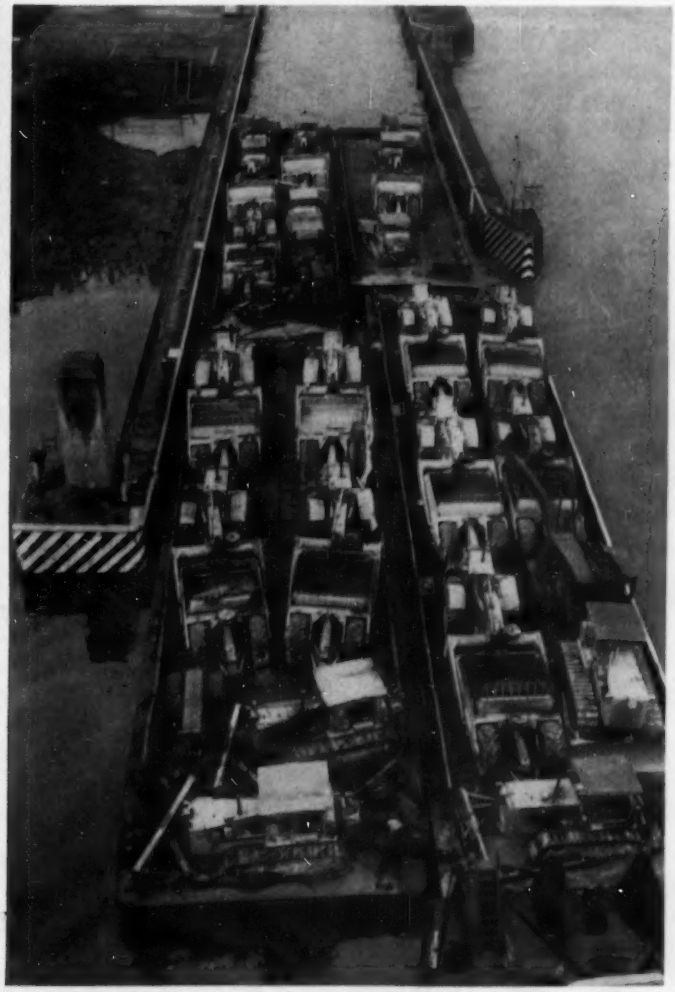


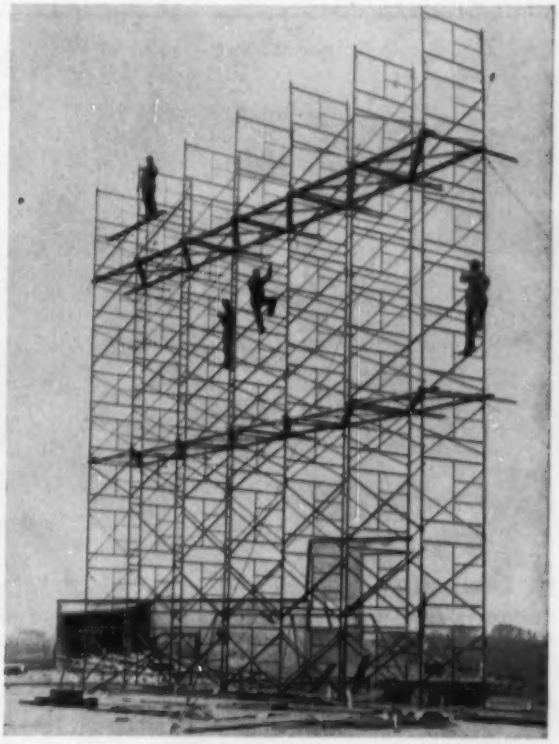
Here's a note of caution. Spring demand is heavy. Deliveries are being pushed back. To be sure you get the mixer you want when you need it, order now!

THE T. L. SMITH COMPANY, 2835 North 32nd Street, Milwaukee 10, Wis.

Affiliated with Essick Manufacturing Company, Los Angeles, California

A-8785-1P



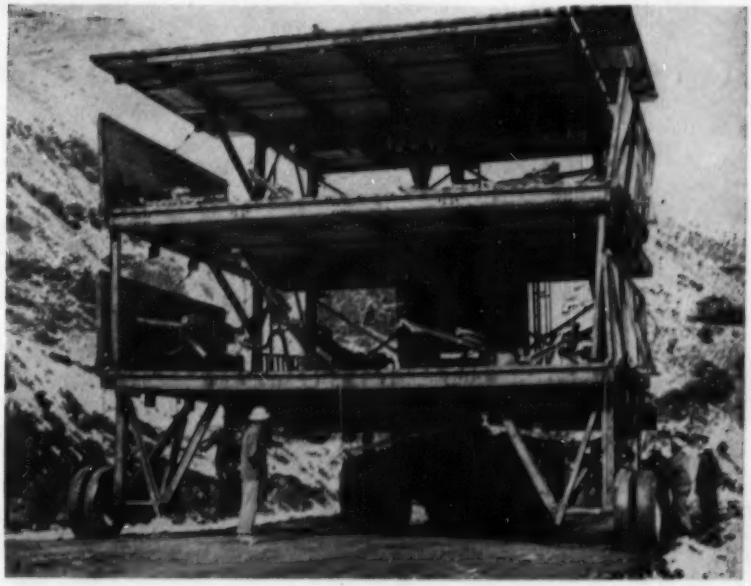


The Show Goes On

When a severe wind storm demolished the screen of a drive-in motion picture theatre at Grand Forks, N. D., Steen Construction Co. of Grand Forks put up 84 frames of Waco 4x5-ft tubular scaffolding and erected a temporary screen in just a day and a half at a cost of $300.

All Aboard

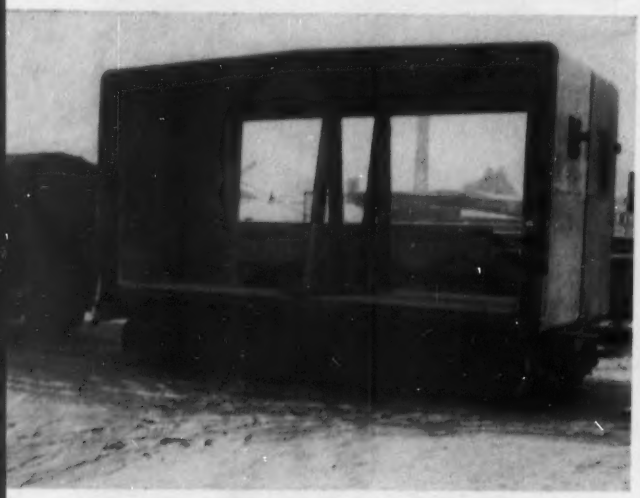
Nearly $1.3 million of earthmoving equipment, loaded on four barges, travelled from Pittsburgh down the Ohio River to near Clarington, Ohio, to begin site preparation for Olin-Mathieson Chemical Co.'s new aluminum plant. Allegheny Contracting Industries of Pittsburgh assembled the equipment to move 10,000,000 cu yd of earth at the plant site.

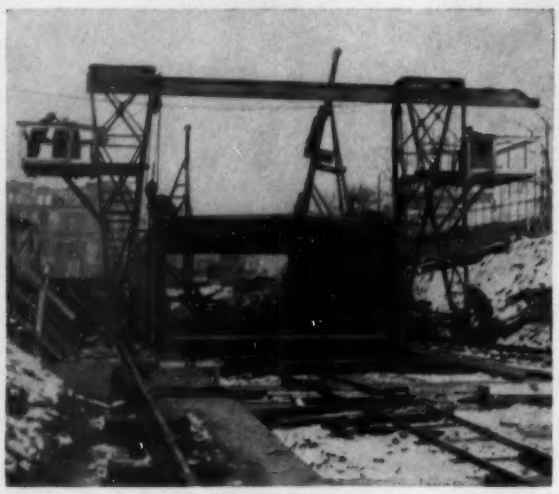


Jumbo Works Fast

A three-deck tunnel jumbo mounting 14 Joy drifters is punching through about 70 ft of rock a day at the site of Brownlee Dam on the Snake River between Oregon and Idaho. Morrison-Knudsen Co., Boise, Ida., built the rig to drill a diversion tunnel 38 ft in dia and 2,600 ft long.

Construction 'Round the World . . .





In Germany

Precast reinforced concrete sections make construction of a 160-ft long pedestrian tunnel under a street in Hamburg a fast, efficient operation. Prefabrication of the tunnel sections in the contractor's yard permitted work to go on during one of the coldest winters in recent years. And the method made possible minimum interruption of traffic. Contractor Paul Thiele cast 34 of the tunnel sections, each about 5 ft long, 7 ft high, and 16 ft wide. He used a radiation gas heater to speed drying so that a section was ready to transport to the job site about 48 hr after casting. A Culemeyer trailer hauled the sections from the yard, and a gantry crane with hand winches installed them. Thiele was able to put in place three or four tunnel sections each day.

In Hawaii

A building to house 34 bowling alleys boasts what probably are the largest steel trusses ever fabricated and installed in Hawaii. Mutual Welding Co. fabricated them at the job site, and Nordic Construction Co. installed them. The trusses are 154 ft long, 22 ft from top to bottom chord, and weigh about 8 tons. They are supported on columns at the rear of the building. In the front, they cantilever out 34 ft over the supporting columns. Clear span is 122 ft. The $348,000 building will be completed next month.

BEAMS THAT CARRY MORE LOAD WITH LESS WEIGHT. Inland's new structural mill now provides Midwest builders with a dependable source for Wide Flange Beams, Light Beams and Joists. Far stronger per unit of weight than standard beams, Wide Flange Beams save from 8% to 35% in weight alone and make possible longer spans with fewer intermediate supports. An important extra advantage of the Inland beam is the fact that its inside flanges are parallel, without taper, which simplifies the job of making connections and speeds construction. Wide Flange Beams available in sizes ranging from 8"-24".

How steelmaking progress helps you

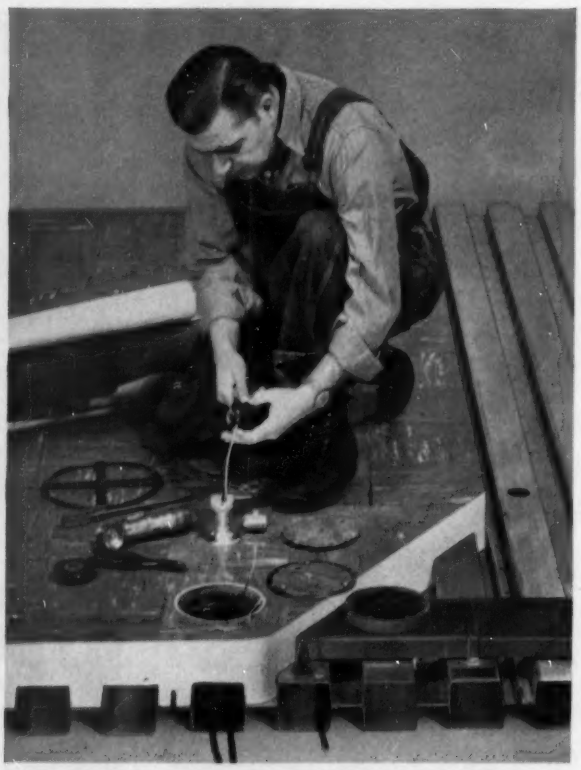
BUILD BETTER FOR LESS

Many of the advances in architecture and construction techniques in recent years have been due to the improvements in the construction industry's most vital single material—steel. Steel now performs jobs that would have seemed miraculous a few decades ago. New types of steel have made possible better buildings and faster, more efficient construction. For instance, today's structural steels give more strength with less weight. A new galvanizing process gives steel far superior protection against corrosion. Advanced methods of fabricating steel floor and roof sections have speeded up construction and made buildings far more functional.

As a major supplier to the construction industry, Inland has consistently expanded and modernized its facilities to provide the new and better structural steels that help you design better and build better . . . for less. For more about Inland products for the construction industry, please turn the page.

(Advertisement)

CELLUFLOR simplifies design, speeds construction, reduces costs.



CELLUFLOR provides for in-floor wiring to outlets any place any time at low cost.

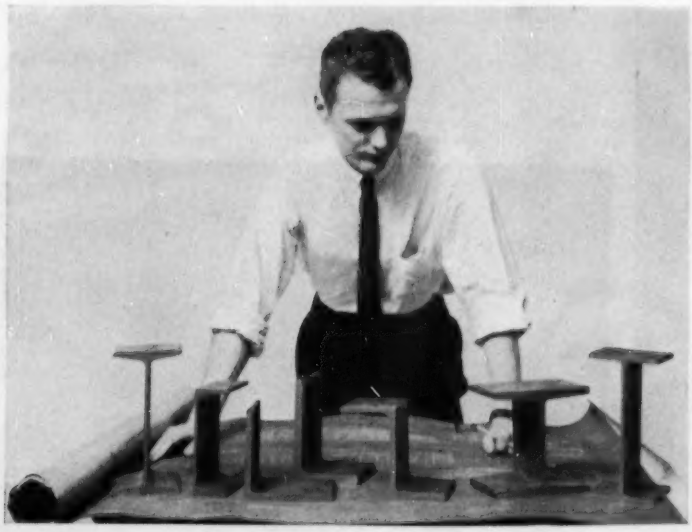
MILCOR CELLUFLOR* PERMITS LIGHTWEIGHT DESIGN, SPEEDS CONSTRUCTION AND PROVIDES ELECTRICAL FLEXIBILITY

MILCOR CELLUFLOR, manufactured by Inland Steel Products Company of Milwaukee, illustrates how engineering with steel can result in more functional design and lowered building costs. CELLUFLOR permits engineering freedom for the design of the newest light weight structures. Once installed, it provides a perfect work and storage platform for all trades.

Because it is made of durable Inland TI-CO Galvanized Steel, CELLUFLOR easily withstands the ravages of weather and construction traffic. In the finished building, CELLUFLOR insures electrical flexibility required to meet tomorrow's wiring needs. Its raceways, spaced on 6-inch centers, permit the installation of power anywhere. Outlets may be easily moved at low cost.

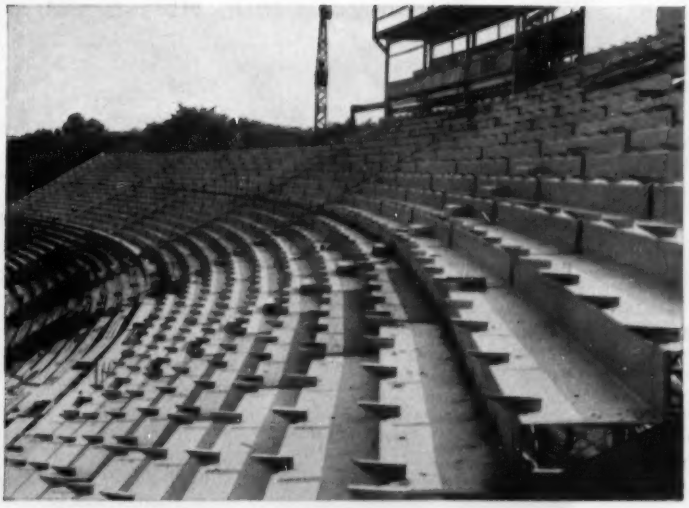
MILCOR STEEL ROOF DECK, long the standard of closed-rib decks, is now available in three new profiles—each with special features to fit job requirements. All three styles are quickly erected in any weather, all are available with either a TI-CO galvanized finish or with a baked enamel prime finish on a Bonderized base. Typical of a low-cost Milcor Roof Deck application is the Milwaukee County Stadium (left), home of the Milwaukee Braves. Milcor Steel Roof Deck was used to cover the stands. A bonded roof coating of asphalt insulation and 3 ply roll roofing was then applied to the top of the deck.

**Registered Trade Mark*

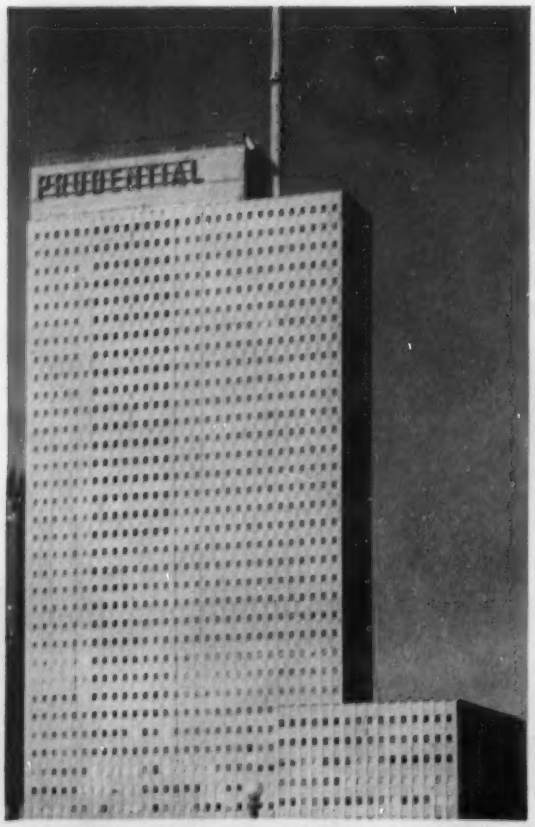


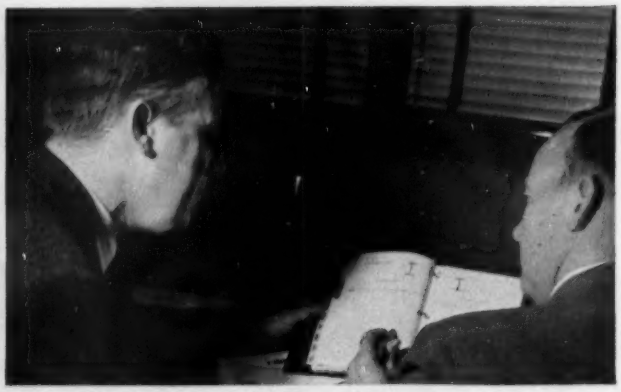
A COMPLETE LINE of structural steel shapes, including Wide Flange Beams, Wide Flange Light Beams, Wide Flange Joists, American Standard Beams, H-Beams, American Standard Channels, Equal Angles, Unequal Angles, Zees, and Bulb Angles, in the sizes you need, are available at Inland.

INLAND SUB-PURLINS are especially designed to provide a lighter, more efficient member for poured or pre-cast tile roof construction. Rolled from selected rail steel, they are cut to fit your particular job. They can be quickly and easily installed, without waste, providing lateral support, bridging or anchoring for the main purlins.



RUGGED INLAND 4-WAY® SAFETY PLATE offers a wide variety of ways to cut construction costs and make almost any structure safer and easier to maintain. Rolled from open hearth steel, 4-WAY can be used to provide structurally strong floors, ramps and stairs, often eliminating sub-floors and extra bracing. Specially designed slip-resistant tread provides safe traction for feet and wheels.





A GOOD MAN TO TALK TO when it comes to engineering or estimating problems is your Inland representative. Through him you draw on the wide experience of Inland specialists in construction problems. You'll get expert help in selecting steels and estimating costs.

MORE THAN 1,000 TONS of Inland TI-CO* galvanized sheets went into the duct work and air handling equipment for Chicago's giant Prudential Building. TI-CO galvanized sheets were specified for the job (largest sheet metal installation in the Midwest) because the zinc coating stands up under the toughest punishment without cracking, flaking or peeling, keeping rust sealed out. TI-CO sheets are made by a patented continuous galvanizing process which applies a zinc coating that is extremely tough, yet just flexible enough to resist hammering, bending and lock-seaming without cracking.

Registered Inland trade name

INLAND HI-BOND* REINFORCING BARS have deep, reversed, double-helical ribs which provide a mechanical grip to give maximum bond in concrete, thus permitting greater use of steel's potential strength in concrete construction. HI-BOND's design also improves transfer of stresses, crack control and resistance to slip . . . advantages that will make possible higher design stresses and thereby lower construction costs. HI-BOND meets standards set up by ASTM A305.

INLAND STEEL COMPANY

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MAY, 1956

VOLUME 38 • NUMBER 5

HENRY T. PEREZ, Editor

CONSTRUCTION METHODS AND EQUIPMENT

Better Highways At Last?

PASSAGE of the Fallon Bill by the House of Representatives is a giant step forward toward the goal of better highways and elimination of scenes such as the above. Next hurdle is the Senate. But differences between the House bill and the Senate's Gore Bill (passed last year) can readily be compromised, and the concensus is that a multi-billion highway construction program will be enacted this session of Congress.

Main point of difference between the two bills as they affect contractors is in setting of labor wage rates. The Senate measure ignores the question. The House version calls for application of the Davis-Bacon Act to construction of the interstate portion of the highway program.

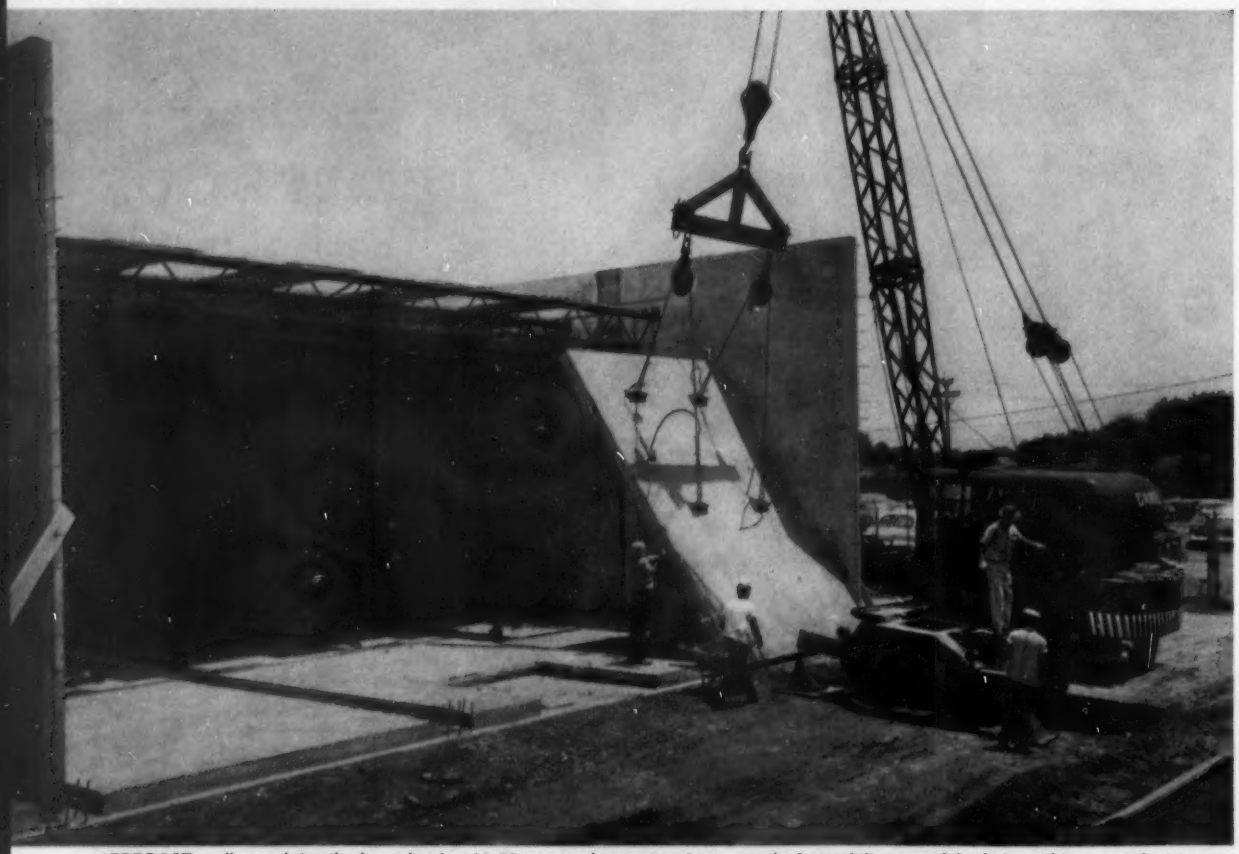
Under Davis-Bacon, if the provision is retained in the final version of the highway bill, wage rates would be set by the Secretary of Labor to conform with those prevailing on similar work in the immediate vicinity. That sounds harmless enough. But the Secretary determines the "prevailing" rate, and there have been instances in the past when such determination has been arbitrary, unrealistic, and costly. Nor is there any recourse through the courts to set aside incorrect rates.

Then too, highway construction contracts are to be let by the states, not the federal government. There is no need for federal wage fixing on work handled by the states. Indeed, with the greatly increased job opportunities under the expanded highway program, contractors would find it impossible to hire workers at less than a true prevailing wage.

Are highway workers relatively underpaid? Evidently not, for the U. S. Department of Labor reports that in September highway and street construction workmen averaged $2.29 per hr, $102 per week. Average hourly rate for factory workers was $1.93 per hr, with a weekly pay of $77.

Not only is extension of the Davis-Bacon Act to highways unnecessary, it also would increase the cost of construction and the cost of government. It would interfere with free collective bargaining and would hamper contractors' operations.

Nevertheless, even with the federal wage-fixing provision in the Fallon Bill, better highways are just ahead. They are long overdue.



PRECAST wall panel is tilted up by Lorain 30-ton truck crane. Truss-type lifting frame with pair of snatch blocks equalizes load on four pick-up points and eliminates conventional lifting beams. To keep panels from sliding on slab during tilting, metal strips are cast in slab and panel to act as hinges. If vacuum develops between panel and slab, small jacks break bond.

Tricky Tilt-Up Cuts Warehouse Cost

IT TAKES A LOT of know-how to build a 120,000-sq-ft warehouse in only 70 calendar days—especially when the job requires a complete sprinkler system, a fence, and railroad siding.

But Daniel Construction Co. of Greenville, S. C., did just that for the Commodity Warehouse Corp. at Greenville. Their secret was an economical, efficient tilt-up method.

The owner specified a completely fireproof one-story warehouse 500 ft long and 240 ft wide. It had to be broken into 10 individual compartments, separated by 24-ft high walls. Both interior and exterior walls could be made of either 12-in. masonry or 8-in. reinforced concrete.

Daniel chose concrete and elected the tilt-up method of erection. Tilt-up would cut form work to the minimum and eliminate entirely the slow crane and bucket method of placing concrete. It would require tilting of 192 panels, each 20 ft wide, 24 ft high, and weighing 23 tons.

Daniel started a crew at one end of the building pouring footings and 5-ft high foundation walls. As this crew moved ahead, a second crew began pouring alternate sections of the floor slab 200 ft long. These slab sections would serve as casting beds for tilt-up wall panels, and the adjacent left-out slab areas would allow ready-mix trucks to chute concrete directly into forms. Later, the same areas would permit a crane to tilt-up any panel without riding on a slab.

The alternate slab sections were poured an extra foot wide to provide a wide base on which panels could be tilted. Except for thickened areas under the walls, these slab sections were 12 in. thick. Mechanical trowels and finishers made frequent passes to assure a smooth surface.

When the first few sections cured, the contractor coated them with Teckote parting compound. Then, to prevent workers' shoes from scuffing the Teckote, he spread a thin layer of foundry dust on top.

Forms

Forms for the tilt-up wall panels were laid on both sides of each floor slab section and also on the adjacent loading dock (see diagram). Forms were simple because they were needed only on the sides of the panels. At the top and bottom, the forms consisted of plywood facing backed by 2x4's. For the sides, a set of 2x4's one on top

of the other was placed against each of the two adjacent panels. The two bottom 2x4's were braced against each other with wedge spreaders. To strip, wedges were knocked out, and then spreaders and 2x4's were removed.

The top 2x4's on adjacent panels were connected to make the upper half of the form handle as a single unit. The sides of this upper half were tapered ¼ in. to permit easy stripping. Between the halves, holes were drilled to allow reinforcing bars to protrude.

Maximum reuses cut Daniel's form costs to the bone. One set of wall panel forms were used 15 times. They already had been used 15 times on a previous job, and are still good for another 15 uses.

The only other preparation before pouring was placing inserts. Two Superior inserts were positioned at each of four pickup points. Daniel filled them with cork instead of conventional bolts so they would leave no marks on the panel. Two other inserts were placed upside down to receive adjustable braces required later to plumb the panels.

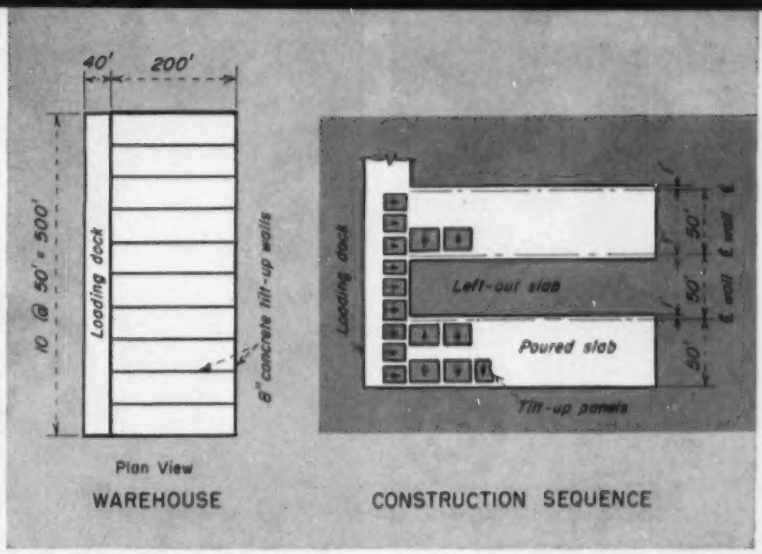
When the form was prepared, concrete was chuted directly from trucks. By good organizing and scheduling, Daniel poured up to 435 yd of concrete in a 9-hr day, including foundations, slabs, and panels.

Tilting

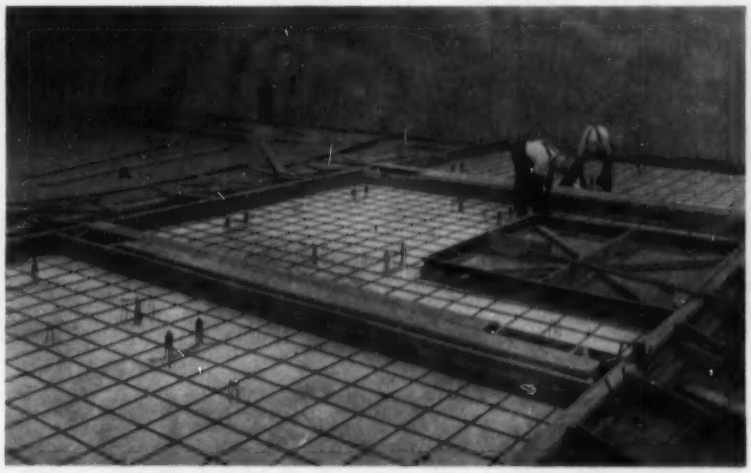
As soon as a group of panels had cured, they were stripped. Clip angles were bolted to each pair of inserts, and a Lorain 30-ton truck crane moved in to tilt-up the 23-ton panels. Wire ropes connected to the insert angles were reeved through snatch blocks hung from a steel-truss lifting frame. The snatch-block assembly equalized the load on the four pick-up points, eliminating the need for conventional lifting beams.

In a few cases, a vacuum developed between the panel and the slab, and the panel could not be pulled away. To break the vaccum, clip angles were threaded over protruding reinforcing bars at the sides of the panel and lifted slightly with a simple truck jack. The vacuum dissipated, and the truck crane quickly tilted up the panel.

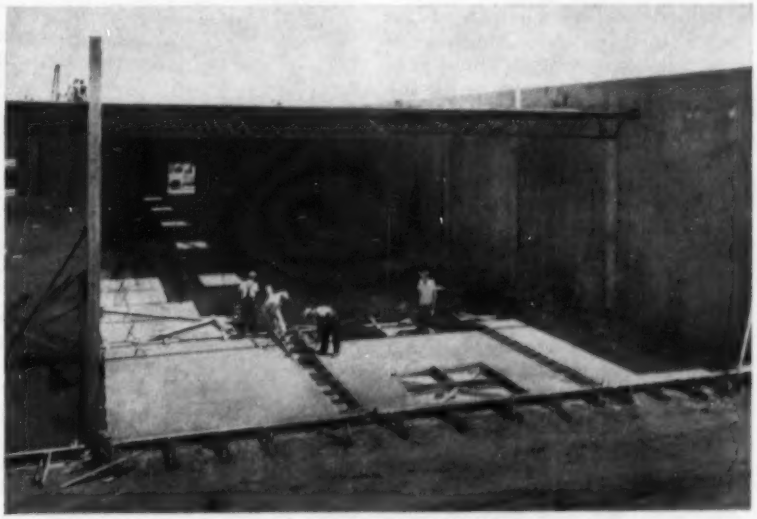
One of the big problems of tilting is preventing the base of the panel from sliding. Daniel overcame this in two ways. He placed his inserts as high as possible to



WAREHOUSE consists of 10 compartments separated by tilt-up walls. To keep cranes and ready-mix trucks off slabs, alternate compartment floors are left out temporarily.

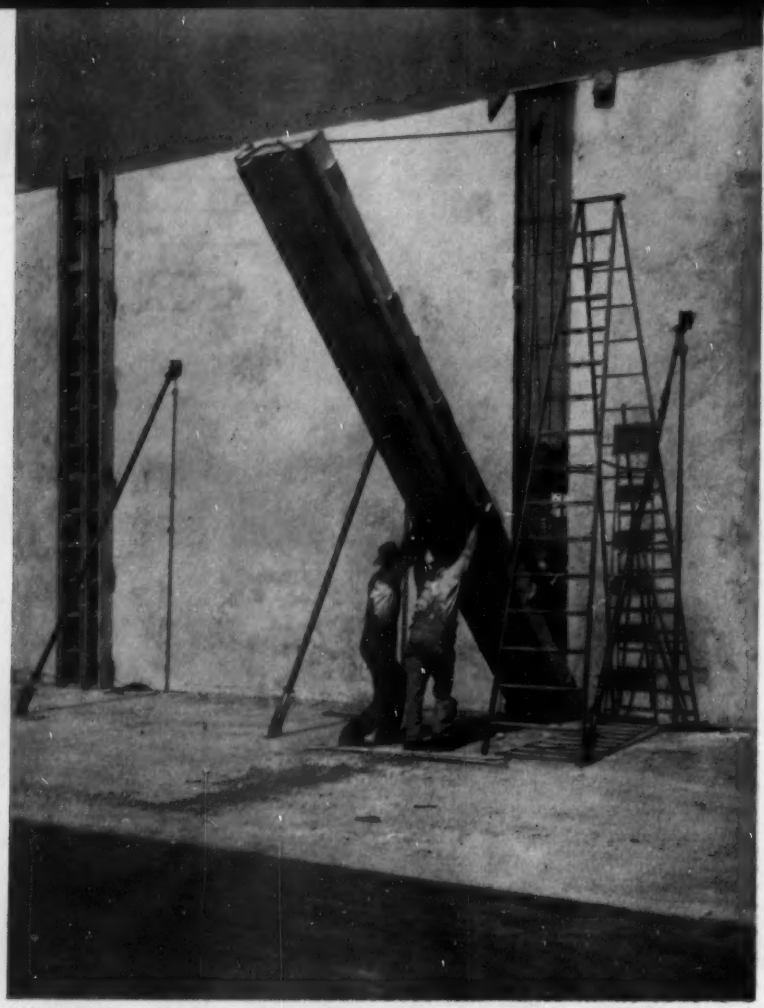


FORM COSTS for tilt-up are low because they are needed only on sides. Superior inserts are placed near top of panel to concentrate weight at bottom and aid tilting.



STRIPPING is simple. Upper half of side form for adjacent tilt-up panels is removed as one piece. To strip lower half, wedged spreaders between 2x4's are knocked out first.

GAP between adjacent wall panels is filled with 2-ft concrete pilaster 1 ft thick



PILASTER form is tilted in place by hand. It is made of plywood backed by 2x4's and walers. Superior adjustable tilt-up braces anchored to inserts help plumb wall panels.

TILT-UP WAREHOUSE

Continued from page 53

concentrate weight in the base. And he cast three strips of 22-gage sheet metal, half in the foundation slab and half in the base of the panel, to serve as a hinge when the panel was tilted. These precautions enabled Daniel to tilt the panels without sliding. Superior adjustable jacks then were screwed into inserts on the inside of the panel and anchored to the floor.

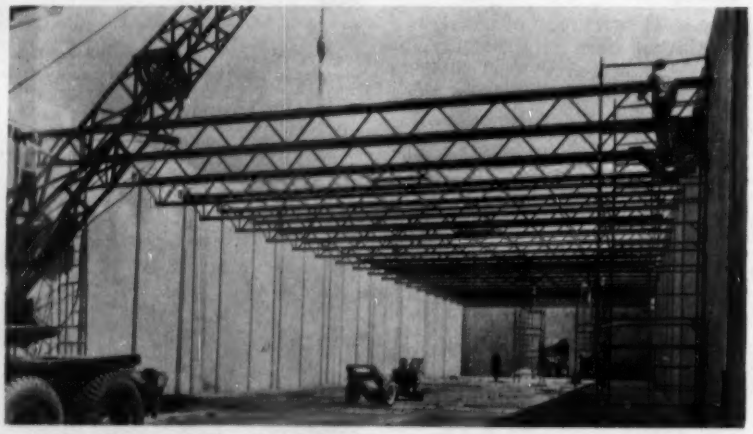
Working right behind the tilting crew was a team of men building 12-in. thick pilasters in the gaps between erected wall panels. Simple plywood-faced forms backed by 2x4's and walers were hand-tilted in place, tied together, and filled with concrete.

As soon as the walls for three sides of a bay were in place, a Shield-Bantam 7-ton truck crane placed long-span steel bar joists between walls. A wood deck was placed on top and covered with built-up roofing.

When most of the walls were up, the contractor poured the left-out foundation slabs. Later, outside wall panels for the remaining open side of the building were cast and tilted in place.

With a maximum of 60 men, Daniel cast and tilted 192 panels in only 30 calendar days. In another 40 days, the warehouse was completed.

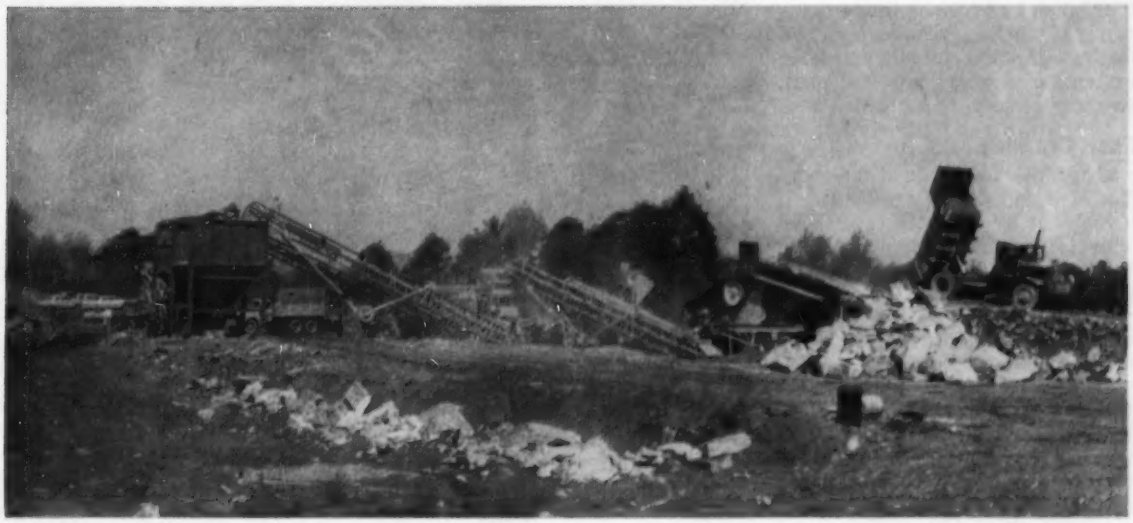
O. C. Vaughn was superintendent, and C. A. Thrasher, vice-president of Daniel Construction Co., Inc, was general superintendent.



LONG-SPAN joists are placed between walls. They are covered with wood decking and built-up roofing. Built to store cotton, big structure is equipped with sprinkler system.

GENERATING TRAILER houses Caterpillar D397 diesel-electric set. Big 150-hp motors draw 2,300 volts, and others draw 440.

PLANT SUPERINTENDENT watches from trailer which houses transformer and controls. Push-button panel actuates plant's motors.



PORTABLE PLANT turns out two sizes of stone at rates up to 200 tph. It is fast to set up. Only a few hours after arriving at site, plant is ready to produce. No wiring is required. Power lines are simply plugged into receptacles at trailer.

Single Generating Set Powers Big Portable Crushing Plant

DIESEL-ELECTRIC POWER offers lots of advantages to a portable crushing plant. It is simple to control, economical to operate, and permits fast setting up and dismantling.

A single generating set, like the one Stockbridge Stone Co. is operating near Atlanta, Ga., can power a big plant. Mounted in a trailer, the huge Caterpillar D397 unit supplies electricity to the plant's 11 motors. Two motors on the big crushers are 150 hp and nine others vary from 5 to 20 hp.

Control Trailer

The two big motors draw 2300 volts, and the nine smaller motors operate on 440 volts. A transformer and controls are mounted in an adjoining trailer. Westinghouse oil circuit breakers handle the 2300-volt lines and a Cutler-Hammer push-button system controls the 440-volt lines.

Once the plant is set up, it takes only a few minutes to develop power. Electric lines are pulled from each motor to the control trailer and plugged into the proper receptacles. No wiring is required. The

(Continued on next page)

big diesel-electric set is started and the plant is ready to go.

Stockbridge Stone Co.'s plant is doing a fast job of producing aggregates on a section of the Atlanta Expressway. MacDougald Construction Co. called on Stockbridge to crush and screen about 125,000 yd of hard granite excavation. Instead of hauling the rock to fill areas, MacDougald found he could make more money by crushing it, spreading some for base course, and selling the rest. Good borrow areas close to the job provide the required fill for the highway.

When MacDougald called on Stockbridge a few months ago the portable plant was just finishing a job. It was dismantled in about four hours and formed into a caravan of crushers, conveyors, and trailers. Within five hours after arriving at the new site, the plant was completely assembled.

Fast Crushing

Crushing is fast and efficient. Euclid dump trucks are loaded at a rock cut by a Northwest 2½-yd shovel. They haul only about 1,000 ft to the plant, where they dump onto a Pioneer apron feeder 3 ft wide and 30 ft long. Rock is fed to a Pioneer 3042 jaw crusher powered by a 150-hp motor.

A 30-in. belt conveyor picks up the crushed material and hauls it to a Cedarapids double-deck vibrating screen 4 ft wide and 14 ft long. Oversize is sent to a Symons 4-ft short-head crusher and returned to the first conveyor for rescreening.

Material passing the double-deck screen is separated into two sizes and carried on two conveyors to storage hoppers. Several sizes of aggregates are made, depending on what is needed at the time. If ⅜-in. minus and ⅜-in. to 1¼-in. stone is made simultaneously, the combined production is about 175 tph. When ½-in. minus and ½-in. to 1¾-in. is processed, total production is about 200 tph.

Aggregate is stored in two 50-ton hoppers which unload one at a time onto a truck loading belt conveyor. If required, the large-size stone can be washed as it enters its hopper.

The plant practically runs itself. Besides a foreman and night watchman, only three men are needed.

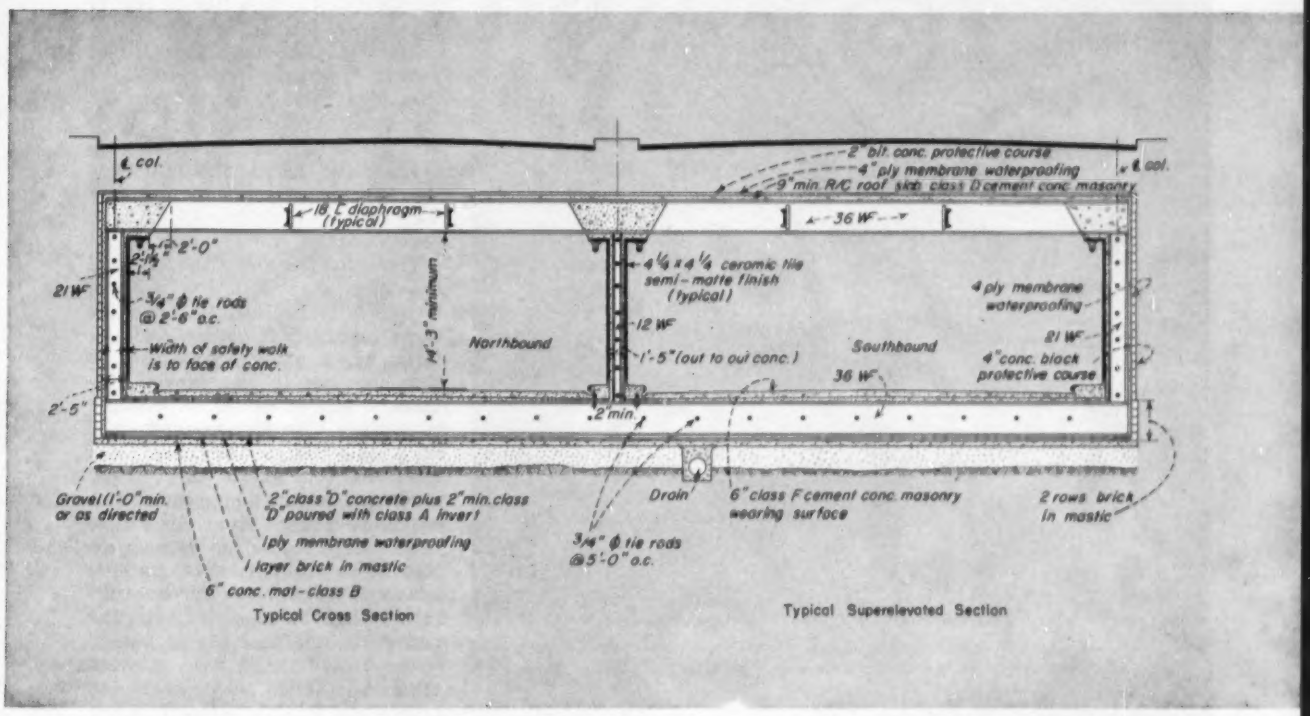
BLASTED ROCK loaded by Northwest shovel is hauled to plant in Euclid truck and dumped onto Pioneer apron feeder. It is carried to Pioneer 3042 jaw crusher.

PRIMARY CRUSHINGS are carried on 30-in. conveyor to Cedarapids double-deck vibrating screen. Oversize goes to Symons 4-ft short-head crusher and is then returned.

TWO SIZES of stone are carried to hoppers, serviced underneath by a truck-loading conveyor. Contractor set up plant on highway right-of-way to handle excess rock excavation.

By ANDREW BORACCI
Associate Editor

OPEN CUT TUNNEL portion of $18 million John F. Fitzgerald Expressway will be one of the widest in the world. Traffic will flow in two directions over both arches and inverts (right). Tunnel construction (below) is reinforced concrete and steel.


℄ col.
2" bit. conc. protective course
4" ply membrane waterproofing
9" min. R/C roof slab class D cement conc. masonry
18' L diaphragm (typical)
36 WF
2'-0"
21 WF
3/4" ϕ tie rods @ 2'-6" o.c.
Width of safety walk is to face of conc.
14'-3" minimum
Northbound
4 1/4 x 4 1/4 ceramic tile semi-matte finish (typical)
12 WF
1'-5" (out to out conc.)
Southbound
4 ply membrane waterproofing
21 WF
4" conc. block protective course
36 WF
2'-5"
2' min.
Gravel (1'-0" min. or as directed
2" class D" concrete plus 2" min. class D" poured with class A invert
1 ply membrane waterproofing
1 layer brick in mastic
6" conc. mat - class B
Typical Cross Section
Drain
3/4" ϕ tie rods @ 5'-0" o.c.
6" class F cement conc. masonry wearing surface
2 rows brick in mastic
Typical Superelevated Section

Tunnel Opens Heart of Boston

PUSHING A 2,400-ft open cut tunnel through the heart of a major city without disturbing a daily flow of 51,000 cars and trucks is not easy. But it can be done by building the tunnel in sections between street intersections and returning later to cut through the streets and connect the tunnel while completed portions of its arch serve as temporary by-passes.

The job is the $18 million tunnel and tunnel approach sections of the John F. Fitzgerald Expressway in Boston. Traffic will flow over both the tunnel's invert and its arch. Its eight, 12-ft lanes make it one of the widest in the world. Though fairly conventional in design, cutting it through traffic demands careful planning and a departure from conventional open cut construction.

Traffic was a problem from the beginning. Boston's South Station disgorges 225,000 people daily. The station stands adjacent to the tunnel, and people need the nearby street intersections to get about. Also, heavy trucking, which supplies and unloads shipping at Boston could not be disturbed.

Serious thought was given the problem by engineers of the Boston Police Department, the Metropolitan Transit Authority, and the Boston Traffic Commission. They decided to change the streets parallel to the tunnel to one-way streets. That was all they could do. Traffic needs demanded that the tunnel be built between existing streets and connected later. Genral contractor V. Barletta Co. handles the job this way:

Barletta excavates a trench about 120 ft wide to required grade with clam shell, shovel, and

CONTRACTOR EXCAVATES up to intersection. Then, skipping intersection, continues on the other side. Method avoids having to disturb daily flow of 51,000 cars and trucks.

TRUCKS DELIVER needed materials directly into the work area. Contractor made truck ramp by pouring one concrete lane starting from the top of the slope and working down.

backhoe until he reaches an intersection. Then he skips the intersection and continues excavating the tunnel trench on the other side. Tunnel construction follows the same build-and-skip pattern. Barletta then will return, dig out the intersections, and build connecting tunnel portions.

Approach Work

Proximity of the tunnel to Boston harbor requires putting down a thick coarse of waterproofing to protect the tunnel against seepage from rising tides.

Waterproofing under invert slabs consists first of a 1-ft-thick layer of coarse gravel followed by a 6-in. mat of 3,000 psi concrete. A single ply membrane waterproofing is placed over the concrete, followed by a layer of brick mopped over with mastic. Over this goes a 2-in. protective coat of concrete.

Slabs for the first 700 ft of tunnel approach range in thickness from 4 to 14 ft. During excavation large quantities of unclassified material which could not be used as slab base had to be removed. Engineers felt it would be cheaper to replace this with concrete and keep the designed grade rather than resort to piles.

Normally the approach slab would be poured from the bottom of the slope to the top to keep the slab from slipping. But Barletta has to do all concreting from within the excavated portion. He first pours a single lane top to bottom to provide himself with a work table on which he can mount cranes and other equipment.

He then works from the center out on both sides of the work table. Additional slab sections are poured conventionally—from the bottom of the slope upwards—and rough screeded. Once approach slabs are completed, Barletta waterproofs invert slabs for the tunnel and places structural steel frames furnished by Bethlehem Steel Corp. at a cost of $4 million.

Structural Steel

Barletta reinforces invert slabs with 36-in. WF beams spaced crossways 5 ft on centers. They are connected with ¾-in. round tie rods. Structural steel is supplemented with reinforcing rods placed top and bottom, both ways.

Upright steel for the outside walls is 12-in. WF beams, 14 ft 3 in. long, set vertically on invert

FORK LIFT TRUCK picks up pallet-load of brick which it will carry to edge of approach slab to be used for sub-slab waterproofing.

STOCKPILING BRICK on 6-in. concrete sub-slab puts it within reach of workmen who next place it over 1-ply waterproofing.

steel 5 ft on centers. Additional reinforcing goes between the steel bays. Columns are wrapped with 4x4 No. 12 mesh and tied together with ¾-in. round tie rods spaced 2 ft 5 in. on centers.

Barletta bolts 36-in. WM tunnel arch beams over the column beams to connect outside walls. They are spaced 5 ft on centers and tied together with 18-in. channel diaphragms. Additional reinforcing also is placed.

Concreting is done in three stages: invert, walls, and arch slab.

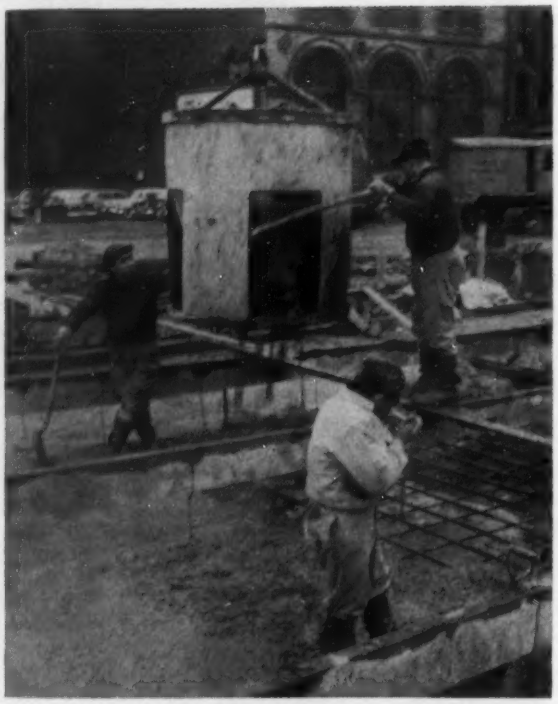
For the invert slab, Barletta first pours a 2-in. slab of Class D concrete to act as a binder between waterproofing and structural slabs. This is topped before its initial set with a 3-ft thick slab of Class A concrete which Barletta rough-screeds to prepare for finished slabs.

Partition walls and outside walls next are formed and poured. Forms are 5x8-ft sheets of plywood panels. They are braced against embankments for the outside walls. No outside bracing is required for the partition forms because the structural steel provides the needed support.

Arch forms also are plywood. They are set flush against the top flanges of the beams. Barletta runs

SINGLE COURSE of brick is placed over waterproofing and mopped over with mastic before structural slab is poured. Structural slab here is 6 ft thick.

IRONWORKER TIES top course of reinforcing rods for slab section prior to concreting. Rods are placed both ways.



WORKMEN DISCHARGE bucket-load of concrete for approach slab. Planks crossed over slab forms are to support reinforcing.

WHILE CONCRETING is underway on one side of job, workmen form second slab section. Method permits working within excavation, thus keeping traffic flowing.

a continuous reinforcing rod across steel over this between structural steel bays. A 9-in. slab next is poured and topped with a 4-ply membrane waterproofing and a 2-in. bituminous concrete protective coat.

Finishes

When structural concreting is completed, Barletta fits invert slabs with curbs, drainage chases, and, finally, a 6-in. concrete wearing surface.

After the tunnelwalls have been stripped of forms, Barletta applies a 4-ply membrane waterproofing to the outside walls followed by a course of 4-in. protective concrete blocks. This again is to protect against tides and ground water. Two courses of brick are placed against the outside of the invert slab walls overlapping the wall joint to protect the invert joint.

To prevent damage to the tunnel's arch, Barletta places up to 4 ft of coarse-grained gravel over the roof in 6-in. layers. This is topped with a bituminous pavement divided by a 4-ft concrete separator.

Once the tunnel progresses this far, Barletta backfills and builds temporary timber roads over the

EXCAVATION is a big item on the job and demands the use of a large variety of equipment. Barletta has over 30 pieces of equipment in operation on the job. Rigs range from front-end loaders to power shovels, backhoes, and cranes fitted with clamshell buckets. These and other rigs will have removed more than 441,000 yd of material before job is finished.

arch adjacent to the existing intersections. Traffic is diverted over the temporary roads while Barletta digs out the remaining intersections and places the connecting portions of tunnel. These are joined to preceding work by shear keys and rubber water stops. When completed, traffic is returned to its original location. Inside finish of the tunnel is yellow ceramic tile.

Barletta's work also includes paving the streets over the tunnel's arch, installing new curbs and sidewalks, relocating pipe lines, and underpinning seven buildings close to the tunnel excavation. More than 118,000 cu yd of concrete with 3,600 tons of reinforcing and 17,370 tons of structural steel will go into the job. Superintendent for Barletta is Frank Venti. Resident engineer for the Massachusetts Department of Public Works on the tunnel section of the Expressway is George Lybrand, working under Edgar W. Kumpel, chief engineer for the DPW. Leo F. De Marsh is DPW project manager for design and location. Consulting engineers on the job are Charles A. Maguire & Associates and Fay, Spofford & Thorndike.

PIPELINE EXTENDS 7,000 ft out from North African coast at Wheelus Air Force Base.

TOWER PROVIDES excellent over-all view of pipe-laying operations. Superintendent stationed on top broadcasts instructions to workmen on ground by walkie-talkie radio.

Gimmicks Help Speed

TWO TIME-SAVING gimmicks enabled American construction crews working off the North African coast to erect two 7,000-ft pipe lines in a race against onrushing tropical storms. The feat proved two things about American construction men: they meet crises with ingenuity, and they can save money doing it.

That was the experience of Crow-Steers-Shepherd, joint venture contractors for the $63 million Wheelus Air Force Base near Tripoli recently.

The pipe lines were needed to feed fuel to American planes stationed at the airfield. Shallow waters and a rocky coast line prevented fuel tankers from coming up to shore. So the Army Corps of Engineers decided to build a mooring for the tankers 7,000 ft off shore. This meant also building pipe lines through which aviation gas and jet fuel could be pumped to on-shore tanks and stored for future use.

The job itself wasn't too difficult. The problem lay in getting the lines placed before a sudden tropical storm would sweep down and tear the lines to pieces. So the operation had to be geared for speed and a minimum of waste motion. Physical complications also had to be solved before construction could begin.

The ocean floor in the area is rocky. A smooth bottom had to be found on which pipe could rest without danger of undue strain. This was specially necessary because the water is comparatively shallow all along the coast, and sudden storms appear frequently. Unless pipes lay properly on the bottom they could be torn loose by a gale.

About 30 days were spent in making sonic soundings of the ocean bottom in the area of about 7½ sq mi before a suitable site was

TRACTOR FITTED with length of cable tows 1,000-ft-sections of pipe into water over a series of rollers specially fabricated for the job. Crane lifts pipe onto the rollers.

African Pipeline Job

ALIGNMENT YOKE, designed to work in water, fits around pipe and prevents currents from throwing it out of alignment. Cables held by workmen will be attached to offshore buoys.

found. A pipe also had to be found which could be floated. Experiments with 50-ft sections of pipes of various diameters led to contractors using a 12-in. dia pipe. The 12-in pipe, when capped to exclude water, floated. An 8-in. dia pipe sank.

The contractor's launching plan was to weld 50-ft pipe sections into 1,000-ft lengths and float them out to the ocean mooring. To carry out the plan with speed, two simple but effective gimmicks were improvised at the job site.

First gimmick was a series of rollers on shore, perpendicular to the surf line, along which the 1,000-ft lengths of pipe were rolled into the water end first. Each roller was a spool-like length of 14-in pipe fitted on each end with a roller bearing. Rollers were mounted on 4-ft concrete footings.

A 15-ton Lorain crane with a 60-ft boom lifted a 1,000-ft length of pipe onto the rollers. Two donkey engines (portions of Clyde hoists) were used on each side of the pipe as tiebacks. The pipe then was rolled into the water by a Caterpillar D7 tractor fitted with a side boom. A second length of pipe next was lifted onto the rollers, its seaward end welded to the rolled-out pipe, and that too was pushed into the water. The process was repeated until all 7,000 ft for each parallel line were afloat.

Second gimmick was designed to keep the alignment and 4-ft spacing of pipes after they were floated. The contractor devised sets of quick-opening yokes, fitted with rollers, which were tied 1,000 ft apart along the path of the pipe. The yokes, which resemble pipe alignment clamps, were tied to buoys anchored to concrete blocks set on the ocean floor.

As the pipe lengths floated seaward, two native fishing boats followed its course. When a yoke was reached, workmen aboard the boat, fitted the pipe through the yoke. Thus the pipe could slide through the yoke yet remain in perfect alignment.

When both pipes had been floated in alignment, valves at the seaward end were opened, seawater let in, the yokes released, and the pipes were sunk 4-ft apart to the ocean bed. Their ends next were picked up by a floating crane and a flange, and 200 ft of armored hose in 25-ft lengths was attached to each end and given a 150-ft hydrostatic test to check for leaks. Purpose of the flexible hose was to

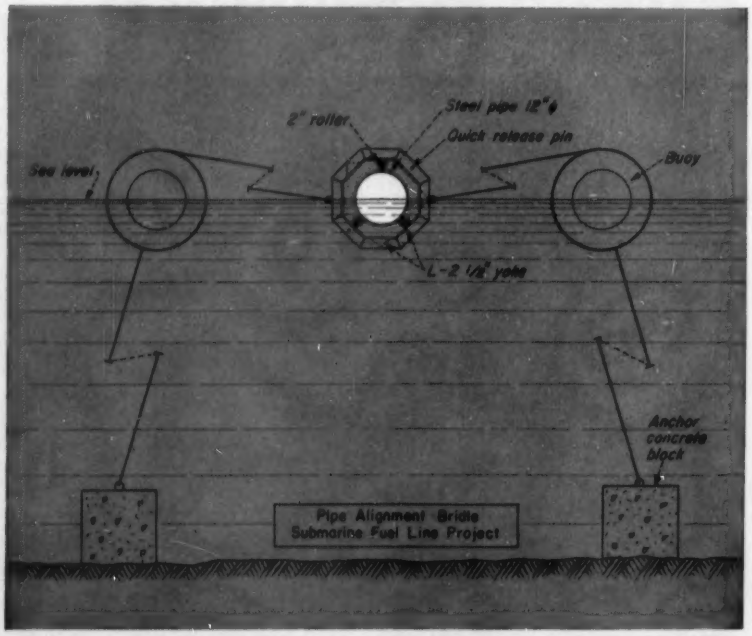
WORKMEN ATTACH 200-ft-length of flexible metal hose to end of pipeline after full 7,000 ft of line has been sunk. Pipeline end then is lowered. Hose comes to rest over mooring and can easily be attached to fuel cocks of tankers anchored offshore.

permit tying into the tanker fuel lines.

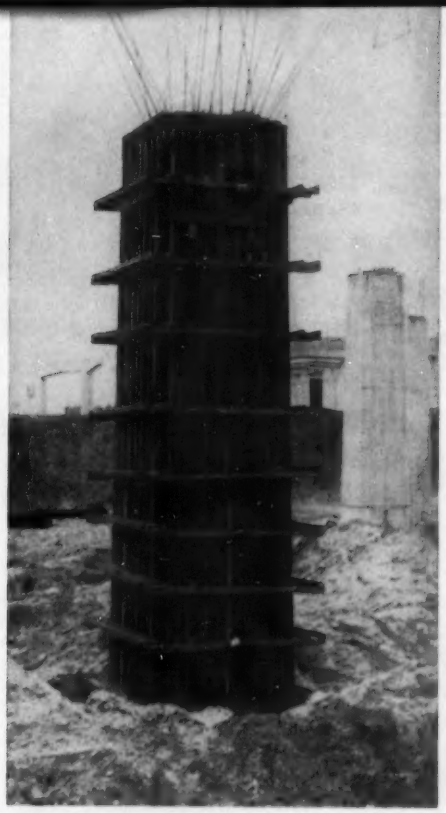
Welding and installation of the first pipeline required 13 hr; the second, 12 hr. Placing each 1,000-ft section, including welding and launching, took 80 min. Welding took almost an hour. It required only 20 min to push each pipe section into the sea.

To protect the pipes from corrosion after they were in place, cathodic-graphite anode beds were placed in 20 ft of water, 2,200 ft offshore. With a rectifier, this maintained a constant DC current on the line inducing a protective calcareous deposit on the pipes.

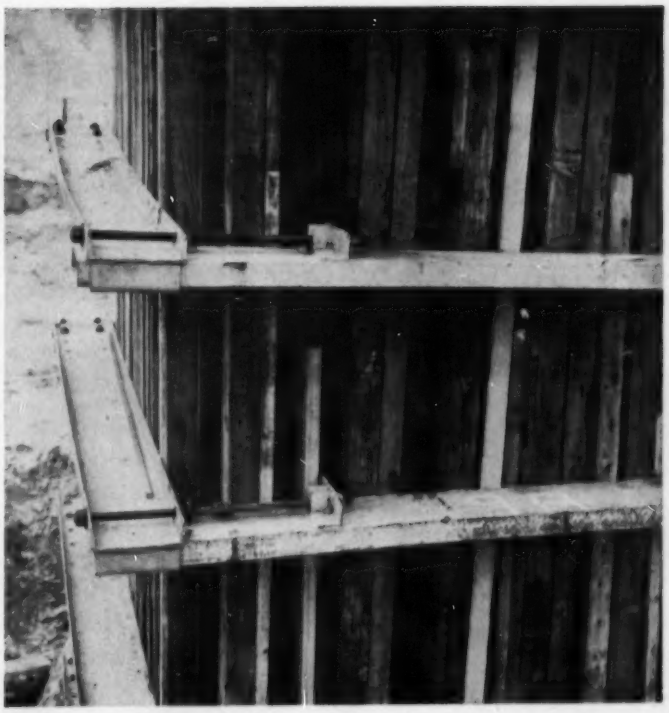
The joint venture contractors include the William L. Crow Construction Co. of New York, J. Rich Steers Inc. of New York, and the Shepherd Construction Co. of Atlanta, Ga. Paul W. Downey is the combine's resident director of construction. Col. J. J. Schmidt, Jr., is district engineer for the Middle East District, U. S. Army Corps of Engineers.



TWO BUOYS ANCHOR pipe alignment yoke in place offshore. Buoys are anchored by concrete blocks to the bottom. Rollers in yoke permit motion while keeping alignment of pipe.



PIER SHAFT FORM filled with concrete waits to be stripped after plumbing guys have been removed.



COLUMN CLAMPS are fitted with long bolts for adjusting to proper size. U-legs welded to underside of channels help keep clamp square.

Remove Shaft Forms Intact

A NEW TWIST in form handling for concrete pier shafts is paying off for Union Building & Construction Corp. The Passaic, N. J. outfit lifts column clamps off in a bundle, then just jacks the form free in one piece without removing any panels. The simple system lengthens form life and cuts stripping costs.

Union is using this method to build 145 multiple-shaft piers for the New Jersey approach to the Walt Whitman Bridge over the Delaware River. Shafts vary from 13 to 60 ft high, and cross sections are as large as 6½ ft square. Most of them call for three faces to be battered 1 on 48, with the fourth plumb.

Shaft forms consist of panels of ¾-in. plastic-coated plywood backed by 4x6-in. No. 1 grade fir studding. These are made up into a box form held together by spikes through chamfer strips that run along the corners.

Column clamps are 10-in. 15-lb steel channels that overlap at the ends. At two opposite corners the clamps are fitted with long adjusting bolts made of 1-in. Superior coil rod. Four standard bolts at the other two corners connect adjacent clamps. Extra bolt holes here, however, permit clamp dimensions to be decreased when the limit of the adjusting bolts has been reached.

Union handles the box form and column clamps with a Link Belt Speeder crane. Its load line sus-

(Continued on next page)

MORE TRICKS

Construction ingenuity on the Walt Whitman Bridge and associated projects has been widespread. The accompanying form-handling story is only one example. Here are some others CM&E has described in previous issues:

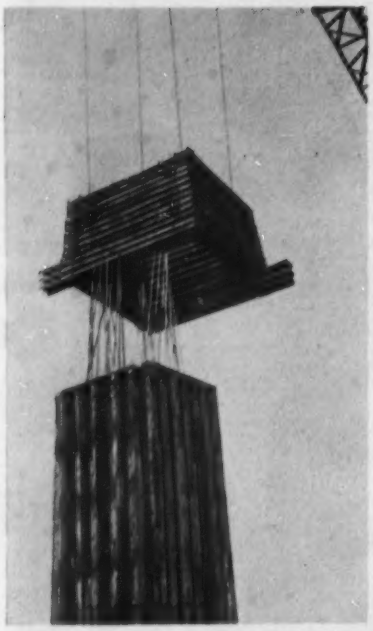
- To settle an approach fill, a contractor mounted a blast-hole drill's spudding mechanism atop a crane to make a unique piledriver to sink mandrels for sand drains. The rig strikes 50 blows per min, releases 25,000 ft-lb of energy per blow, requires no steam or air. **(Oct. '54, p 52)**

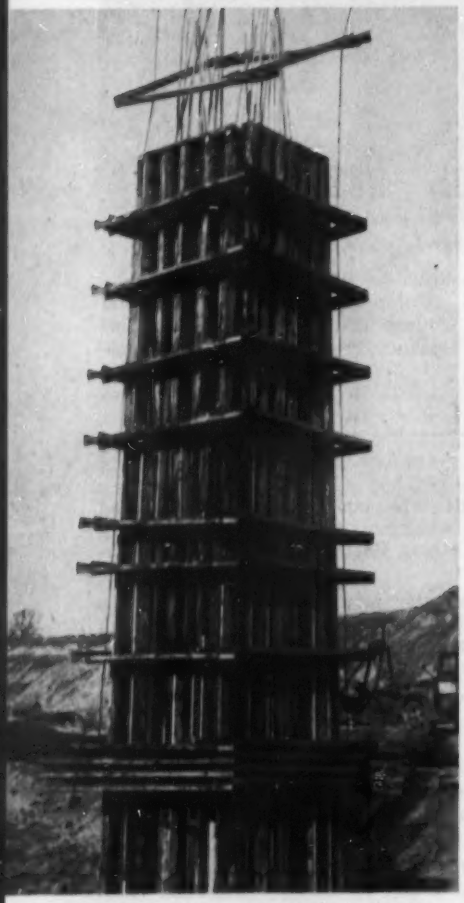
- On anchorage construction, deep-well pumps and open sheeting teamed up to lick a tough excavation problem. **(Dec. '54, p 70)**

- To erect the steel bridge towers, a traveler crept up the shafts while a cradle on the pier base helped turn heavy tower members upright. **(Mar. '55, p 70.)** As the high towers rose, a spacer strut prevented inward deflection of the tower legs and also countered excessive side pressure on the creeper traveler. **(Aug. '55, p 62.)**

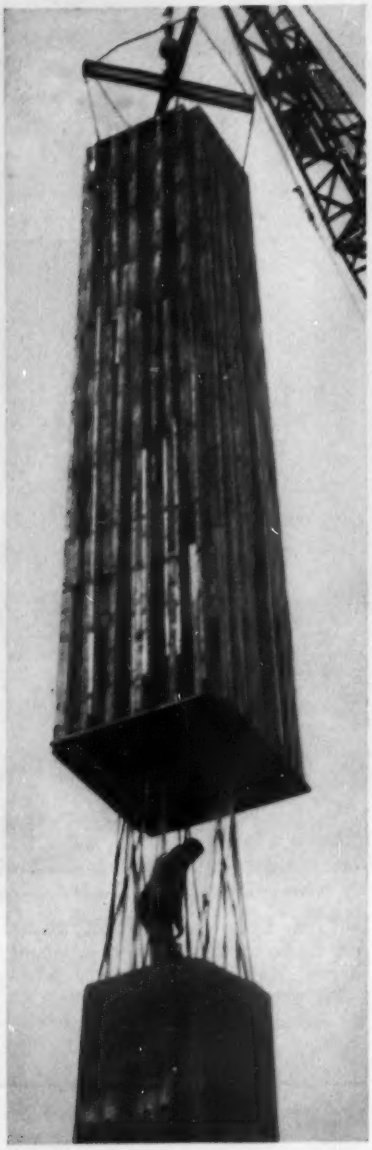
- For concrete approach piers on the Pennsylvania side, the contractor assembled reinforcing steel inside wood box forms on the ground, then lifted the entire assembly in place as a unit. **(Oct. '55, p 60.)**

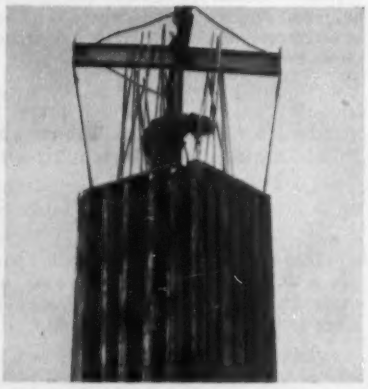
- To spin suspension cables, four wires are pulled from each anchorage simultaneously by a pair of double grooved spinning wheels. About 6½ tons of wire are laid each hour. **(Mar. '56, p 58.)**





CLAMPS ARE STRIPPED by cables to lowest clamp from spreader on crane's load line. Clamps are picked up in turn, and finally come off in a bundle (top photo).





FORM IS STRIPPED by jacking between pier top and crane's spreader, which is cabled to form. When form is free, it is removed intact for re-use (top photo).

SHAFT FORMS...
Continued

pends a cross-shaped spreader fabricated of 10-in. 25-lb I-beams from which, in turn, cables suspend either form or clamps.

Union's Form Handling Procedure

Let's assume that a shaft has been poured (by crane-handled 1-yd bucket dumping into a hopper and elephant trunk) and is ready for stripping. The adjusting bolts on the column clamps first are loosened slightly. Then cables from the four ends of the crane's spreader are dropped down between form and clamps and attached to the lowest clamp. When the crane hoists away, the lowest clamp picks up those above it, and all come off in one bundle.

Form Stripping

The form is stripped next. For this the spreader's long cables are replaced with four short ones that are hooked to transverse bolts near the top of the studs at each corner of the form. A 35-ton Walker jack is centered on the shaft top and posted with a 6x6-in. timber to the center of the spreader. Then combined jacking at the top and driving of wedges at the bottom (between form and footing) breaks the bond with the concrete shaft, and the entire form pops free.

Form Setting

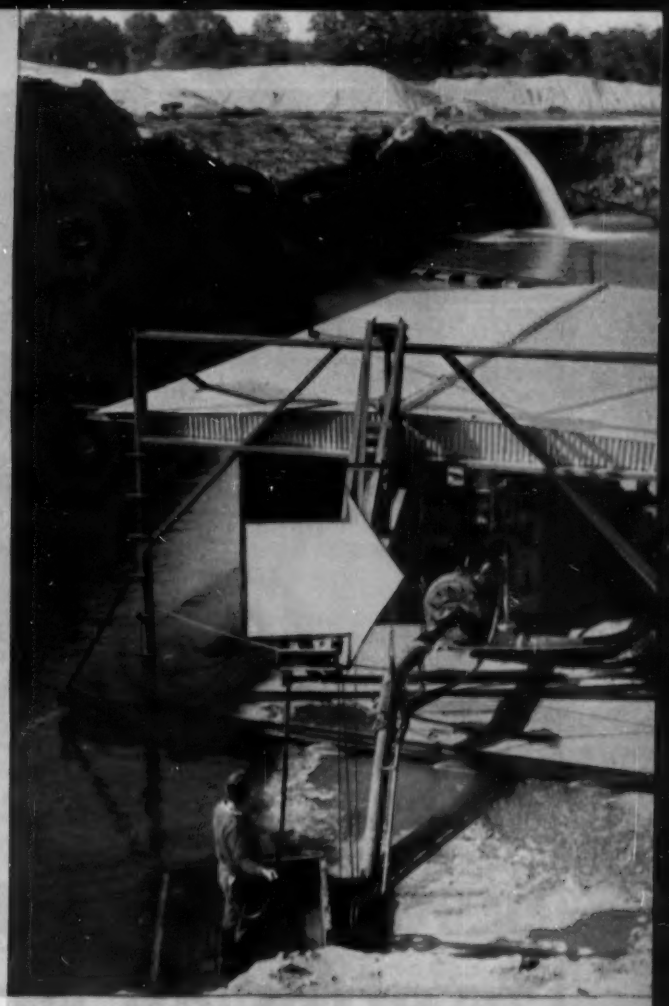
It is a simple matter to reset the form for another shaft pour. The crane just places the box over reinforcing steel tied to the footing, then slips the still-bundled column clamps over the top. Each clamp stops off at the right elevation when it binds with the tapered shaft form. Plumbing the form with eight guy wires and tightening of the clamps' adjusting bolts completes the forming operation.

The cycle described takes approximately 6 hr. Forms are reused 15 to 20 times and are cut down for pouring smaller shafts by just sawing off the bottom.

Engineer S. B. Bailey designed Union's forms, which were built in Union's shops. For the contractor, Frank J. Novack is project manager, and Charles T. Webb is project engineer.

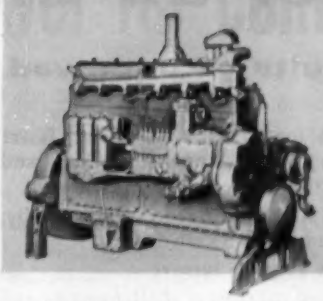
PROOF OF PERFORMANCE!

After 8 years' experience with a D13000, "nothing but another Caterpillar Engine" was considered by the Wenonah Sand & Gravel Co. for its second dredge



This CAT* D13000 Engine drives a 6" pump in a hydraulic sand dredge, operated by the Wenonah Sand & Gravel Co., Wenonah, N. J. There's a 70-foot lift through 600 feet of pipe to the wash tower. The engine, purchased several years ago, is the company's second D13000. According to Earl T. Kroll, Chief Mechanic, here's why: "Having used a duplicate of this engine in another dredge since 1946 with unquestioned economy and reliability, when we wanted to put another dredge into service, there was nothing but another Caterpillar Engine for us, a choice we haven't regretted."

This is just one of thousands of cases where the performance of one Caterpillar Diesel has sold another. There's a reason. These rugged units, available up to 650 HP (maximum), pay off in dollars and cents *on the job*. Simple to operate, they need a minimum of attention and maintenance. And they're sturdily built for a long life of low-cost use in *every* type of construction equipment. What's more, your Caterpillar Dealer stands back of them with prompt, capable service whenever and wherever it's needed!



NOW IN THE CAT POWER LINE-UP: THE NEW D342, AN EVEN MORE EFFICIENT UNIT!

Replacing the D13000, the more powerful, more compact 6-cylinder D342 delivers 210 HP (maximum). And with Caterpillar 4-cycle design, the fuel system requires no adjustment and there are no air boxes or cylinder ports to clean. Your maintenance is reduced to a few minutes a month for oil and filter changes. For complete information about this and other modern heavy-duty engines, see your Caterpillar Dealer.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

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MODERN HEAVY-DUTY DIESEL POWER

OFFSET WING DESIGN
DEEP SLOTTED CHIP-WAYS
PRECISION MILLED THREADS
CONCENTRIC PRECISION MILLED SEATING SURFACE
IMPROVED BRAZING TECHNIQUE
MACHINED FROM SPECIAL ALLOY STEEL
CHOICE OF TWO GRADES OF TUNGSTEN CARBIDE

Only JOY Tungsten Carbide ROCK BITS offer all these features

The results of improved manufacturing techniques

OFFSET DESIGN OF WINGS for drag-free rotation, faster removal of cuttings to permit faster drilling, easy and inexpensive reconditioning.

DEEP SLOTTED CHIP-WAYS allow cuttings to escape readily; the bit does not regrind its own cuttings.

IMPROVED TECHNIQUE FOR BRAZING INSERTS to prevent loss of inserts and to assure maximum drill footage and minimum loss of gauge.

MACHINED FROM SPECIAL ALLOY STEEL and heat treated by an exclusive process to provide high fatigue life and maximum shock resistance. This feature makes the Joy Tungsten Carbide Bit *best for any rock formation.*

CHOICE OF TWO GRADES OF TUNGSTEN CARBIDE—a hard grade for abrasive formations and a medium grade for harder formations.

PRECISION MILLED THREADS insure dimensional uniformity, positive rotation and uniform thread tolerances.

CONCENTRIC PRECISION MILLED SEATING SURFACE permits full contact of bit threads and rod threads. The bit seats firmly against the drill rod upset, radial play is prevented and life of threads and rods is lengthened.

Joy Tungsten Carbide Rock Bits are available in the following gauge sizes:

CROSS TYPE, JHO—1½", 1⅝", 1¾", 1⅞", 2"
CROSS TYPE, JDO—1⅞", 2", 2⅛", 2¼", 2⅜", 2½", 2¾", 3"
X TYPE, JX—3½", 4", 4½"

Write for FREE Bulletin 71-23

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CONSTRUCTION EQUIPMENT MANUFACTURERS
FOR OVER HALF A CENTURY

4-wheel drive traction. The rugged Universal 'Jeep'*, with the extra traction of its 4-wheel drive, is an all-purpose workhorse, whether providing transportation for initial surveys, taking men and tools to their assignments, or carrying supervisory personnel for inspection work. It carries 7 workers or up to half a ton of equipment and supplies, tows heavily loaded trailers on the road or off.

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Transportation. The performance-proved 4-Wheel-Drive 'Jeep' Truck travels through deep fill or over rough terrain with men and equipment. It carries more than a ton of payload, on the road or off—climbs 60% grades, fully loaded.

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In their weight class, 'Jeep' vehicles are the *only* vehicles originally designed and engineered completely for 4-wheel drive, off-the-road use. That's why they're matchless for year 'round construction operations, in good weather or bad.

These versatile vehicles have proved their all-around mobility and wide range of performance on countless construction projects! Their rugged functional design stands up to the toughest use—and the extra traction of their time-tested and performance-proved 4-wheel drive takes them up steep grades—through mud, sand and soft earth—anywhere they have to go in or around the construction site. For highway travel they shift easily into conventional 2-wheel drive. And with power take-off they operate many types of equipment from winches to back hoes.

Multi-purpose 'Jeep' vehicles supplement heavy-duty equipment, spread their costs over a wide variety of jobs, give you additional savings through long life and low maintenance costs. Ask your Willys dealer for a practical, on-the-job demonstration.

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family of 4-Wheel-Drive vehicles

WILLYS... makers of time-tested utility vehicles

*Model CJ-5 shown

WILLYS MOTORS, INC., TOLEDO 1, OHIO

CAT* DW21 – NO. 470

LOWBOWL

SCRAPER

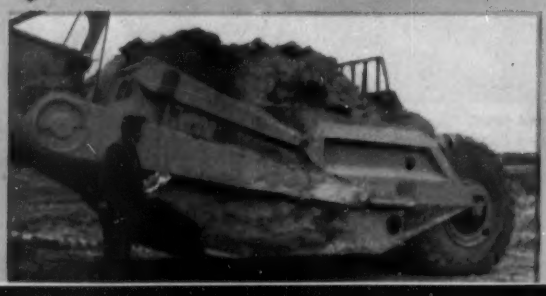
OUTLOADS COMPETITION IN ON-THE-JOB TESTS ON KANSAS TURNPIKE

1. TESTS WERE MADE on contractors' jobs on the Kansas Turnpike. They covered a period of three weeks. For each comparison, the competing units were loaded under similar conditions. Soil density tests were performed right in the loading area to provide an accurate measure of scraper load in pay yards.

2. FIELD ENGINEERS weighed load after load as the competing units passed over a portable platform scale. By subtracting average empty weight from average gross weight, they determined average net load weight. In every test, the No. 470 Scraper with exclusive Caterpillar Lowbowl design consistently carried larger payloads.

3. JOB STUDIES showed that the new turbocharged 300 HP DW21 Tractor had the "go" to equal or beat other units in cycle time while carrying more pay yards. Other features contributing to this unit's success were large 29.5-29 tires, an efficient power train, synchro-safe brakes and the fast, responsive No. 27 Cable Control.

4. LOWBOWL DESIGN, developed by Caterpillar, is a feature of the No. 470 Scraper. With this new concept, the bowl has been widened and lengthened, yet its depth has been decreased. But Lowbowl design is more than just dimensional changes. As the tests show, material is loaded with less resistance clear out to the end of the loading cycle.



TEST RESULTS

No. 470 Lowbowl Scraper (18 cu. yd. struck capacity) vs Competition

No. 470
AVERAGE LOAD
18.1
BANK CU. YD.

Scraper A
18 cu. yd. struck capacity
AVERAGE LOAD
14.8
BANK CU. YD.

LOWBOWL ADVANTAGE:
3.3 bank cu. yd. per load

Test conditions: Damp silty clay—density: 3300 pounds/cu. yd. **Weight Comparisons:** Average net load, pounds: No. 470—59,840; Scraper A—48,675.

Comments: On one load, the operator of Scraper A was asked to obtain maximum heap. It took 2.40 minutes of push loading to pick up a load which weighed 58,875 net pounds—less than the average load carried by the No. 470!

No. 470
AVERAGE LOAD
18.1
BANK CU. YD.

Scraper B
Sideboarded—
18 cu. yd. struck capacity
AVERAGE LOAD
14.3
BANK CU. YD.

LOWBOWL ADVANTAGE:
3.8 bank cu. yd. per load

Test conditions: Sandy clay. Density: 3100 pounds/cu. yd. **Weight comparisons:** Average net load, pounds: No. 470—56,225; Scraper B—44,400.

Comments: Average loading time for both machines was comparable. In total cycle time, the DW21 had the advantage. Its transmission provided a better match to rimpull requirements, and its shorter turns saved time on the fill.

No. 470
AVERAGE LOAD
18.1
BANK CU. YD.

Scraper C
18 cu. yd. struck capacity
AVERAGE LOAD
14.3
BANK CU. YD.

LOWBOWL ADVANTAGE:
3.8 bank cu. yd. per load

Test conditions: Damp silty clay. Density: 3300 pounds/cu. yd. **Weight comparisons:** Average net load, pounds: No. 470—59,840; Scraper C—47,290.

Comments: Scraper C, like Scraper A and the No. 470, has a rated capacity of 18 cu. yd. struck. On the job, where results, not rated capacities, are the true yardstick of a machine's ability, the No. 470 Scraper with Lowbowl design decisively outloaded the other two.

No. 470
AVERAGE LOAD
15.6
BANK CU. YD.

Scraper D
Sideboarded—
18 cu. yd. struck capacity
AVERAGE LOAD
13.3
BANK CU. YD.

LOWBOWL ADVANTAGE:
2.3 bank cu. yd. per load

Test conditions: Heavy clay. Swell about 40%. Density: 3440 pounds/cu. yd. **Weight comparisons:** Average net load, pounds: No. 470—53,580; Scraper D—45,630.

Comments: In the tests, Scraper D scored next best to the No. 470. *Scraper D is the "old" DW21-No. 21,* a unit that set records for high production at low cost the world over. Now, in the new DW21-No. 470, Caterpillar has produced a unit that's even better—and way ahead of competition!

Results on the job, not rated capacities, are the only true measure of a machine's ability to produce. Check the results here and judge for yourself how much the *extra yards* moved by the DW21-No. 470 Lowbowl Scraper can mean *profit-wise* to you!

Your Caterpillar Dealer has a complete report of this on-the-job test on the Kansas Turnpike—as well as similar reports from other sections of the country. Ask him to show you the advantages of Lowbowl Scrapers on your job.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

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BIGGER, FASTER LOADS WITH LOWBOWL SCRAPERS

New SUPERIOR Heavy-Duty SCREED SUPPORTS

Pat. Applied For

For Use with 1¼" and 1½" I.D. Pipe Screeds and Vibratory Screeding Equipment

ADJUSTABLE SCREED HOLDER

Consists of a 1" threaded rod to which is welded a cradle to hold the pipe screed. This cradle is slotted as shown so that the arms may be bent over to secure the 1¼" or 1½" I.D. pipe screed. Threaded onto the rods is a half nut which provides the adjustment.

Especially Designed for Use on Bridges, Underpasses and Overpasses

These Screed Supports are designed to take the heavy loads imposed by traveling vibrating screeding equipment. The Bases for the screed holders are of two types: (1) The Metal Base for use on structural steel members; (2) the Chair-Type Base for use on a plywood deck.

On Structural Steel: As shown above, the Metal Base is tack-welded to the top flange on approximately four foot centers. The Screed Holder is set into the base, and adjusted to height by turning the nut. The threads are fast, three to the inch, and of a contour type, non-clogging and easily cleaned.

On Wood or Plywood Decks: The Chair Base is set on the deck at approximately four foot centers. It is easily secured to the deck by nailing across the upturned legs. If desired, legs can be supplied of galvanized wire. The Chair Base with holder is shown below.

PERFORMANCE

Superior's Heavy-Duty Adjustable Screed Supports have been used on turnpike structures and other projects. Results in the field indicate that this method of supporting screeds provides a simple answer to an otherwise expensive and complicated set up. *Write for Bulletin.*

HOLDER INSERTED IN CHAIR BASE

Only the inexpensive bases are left in the concrete. The Adjustable Holders are easily removed, together with the pipe screed, because the holders are set, not screwed into the base. The nut fully covers the base opening and prevents concrete from entering.

Adjustable Standard SUPERIOR SCREED CHAIRS

FOR FORMED SLABS 4½" AND GREATER

With re-usable screed holders using 1" I.D. pipe and rectangular bars for screeds.

FOR SLABS ON FILL

With re-usable screed holders using 1" I.D. pipe and rectangular bars for screeds.

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Three Big Hangars

Building the huge hangars that modern aircraft require poses unusual problems for contractors. Here are reports on three jobs that call for plenty of construction skill and ingenuity.

At Hill Air Force Base . . .

Big precast girders present tricky erection problem

. . page 74

At Kelly Air Force Base . . .

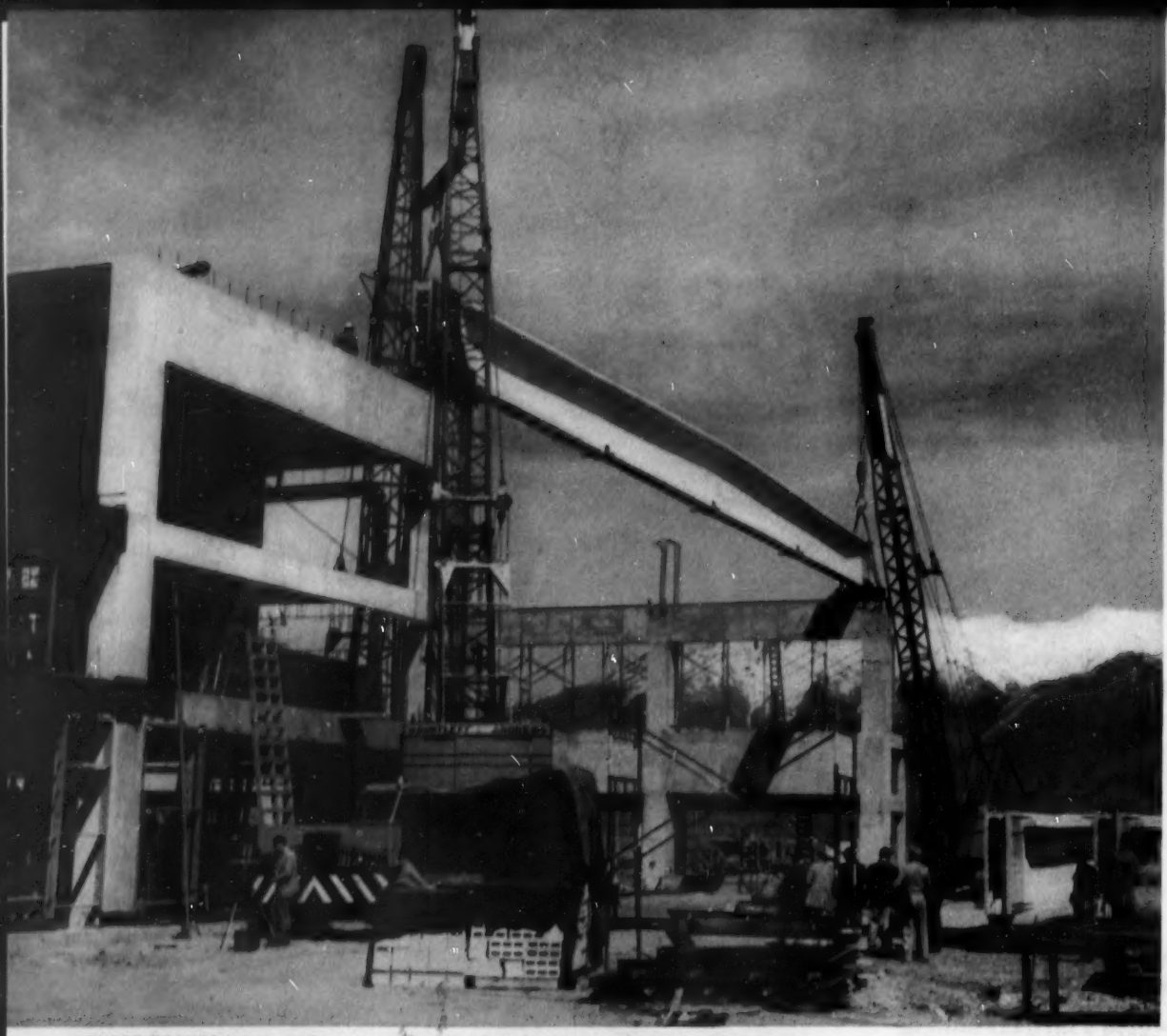
Rigid trusses frame the world's largest hangar

. . page 84

At Philadelphia's Airport . . .

Cables anchored in concrete bents support roof

. . page 92



THREE CRANES hoist record precast girder into place for Air Force hangar. A Manitowoc 50-ton crawler handles one end, and two 35-ton P&H truck cranes take care of the other.

BY L. L. WISE
Associate Editor

Big Girders Take Careful Handling

CAREFUL TEAMWORK of men and machines was the key to erection of record-sized precast concrete girders for a hangar at Hill Air Force Base near Ogden, Utah.

Each of the 10 girders was 136 ft long and weighed 84 tons. They are believed to be the biggest concrete girders ever precast for a building structure.

The formwork required to cast these big units in place would have been prohibitively expensive. And substantial lateral movement of the girders during erection would have been risky. So Jacobsen Construction Co. of Salt Lake City, Utah, worked out a method of erection to fit the situation.

A team of three cranes — one 50-ton Manitowoc crawler crane and two 35-ton P&H truck cranes —hoisted each girder 40 ft to roof level. Jacobsen provided for horizontal movement by mounting the girders on dollies and moving them on rails. At ground level, the rails were mounted on steel beams set on concrete pads to permit movement of the girders from casting position to storage position, and finally to erection position. At roof level, the rails were mounted on spandrel beams so each of the girders could be moved down the building to final position.

Casting

Jacobsen assembled two sets of girder forms and installed two casting positions. Concrete slabs supported the casting work, and two rails—one at each end—were run through the casting positions. The rails were mounted on 18-in. I-beams placed on the slab.

Forms were plywood faced and braced on the outside by light steel frames. One side form was erected, then 1⅛-in. prestressing rods and other beam reinforcing was placed, and finally the second side form was erected.

A mixing plant located only a

(Continued on page 76)

On housing development jobs...

the No. 955 Traxcavator* pays its way

From digging basements to building streets and grading lots, the new CAT* No. 955 Traxcavator is a bearcat for work, a money-maker for contractors.

The machine shown here is owned by R. & M. Construction Co., St. Louis, Mo. Working on an 83-home project in the Crestwood area of St. Louis, the No. 955 is in constant use, forming subgrade for streets, digging sidewalks, backfilling foundations, spreading and grading topsoil. Mr. Howard Skinker, Master Mechanic and Grade Foreman, says: "This new No. 955 is a big improvement in tractor shovels. The increased visibility and new bucket mechanism make it a much more valuable machine."

The No. 955 is one of three new Traxcavators in the Caterpillar line. Its bucket capacity is 1½ cu. yd. The No. 933 has a 1-cu.-yd. bucket; the No. 977, 2¼-cu.-yd. All three machines have balanced weight, traction and power to dig in hard material. They lift loads surely and quickly and are easy to maneuver. One-hand bucket operation and a comfortable seat set high for visibility give the operator a break. There's a long-lived, trouble-free oil clutch of proved superiority. The 40-degree bucket tilt back at ground level assures full loads at every pass.

If you're looking for the right unit to meet your excavating and loading needs, ask your Caterpillar Dealer for a demonstration right on your job. You can trust his trained service men and factory parts to keep your Cat equipment in top working order.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

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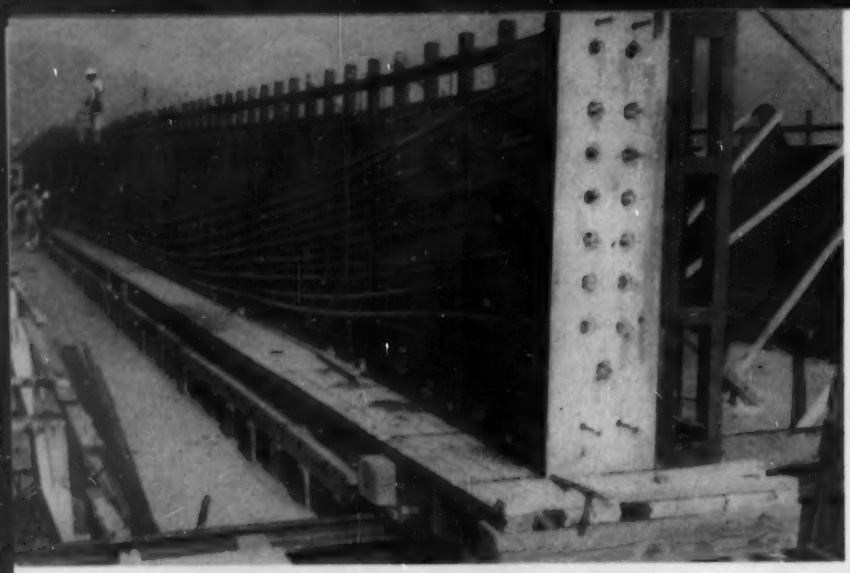
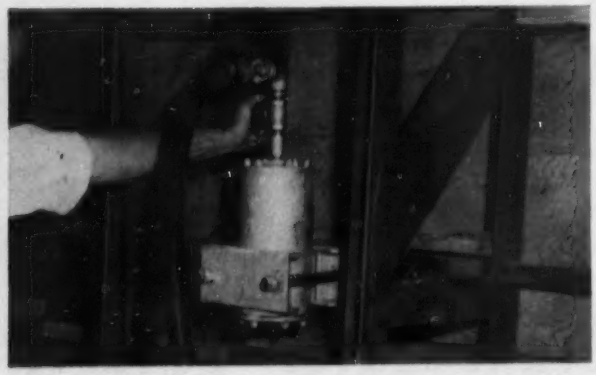
MODERN HEAVY-DUTY EXCAVATING EQUIPMENT

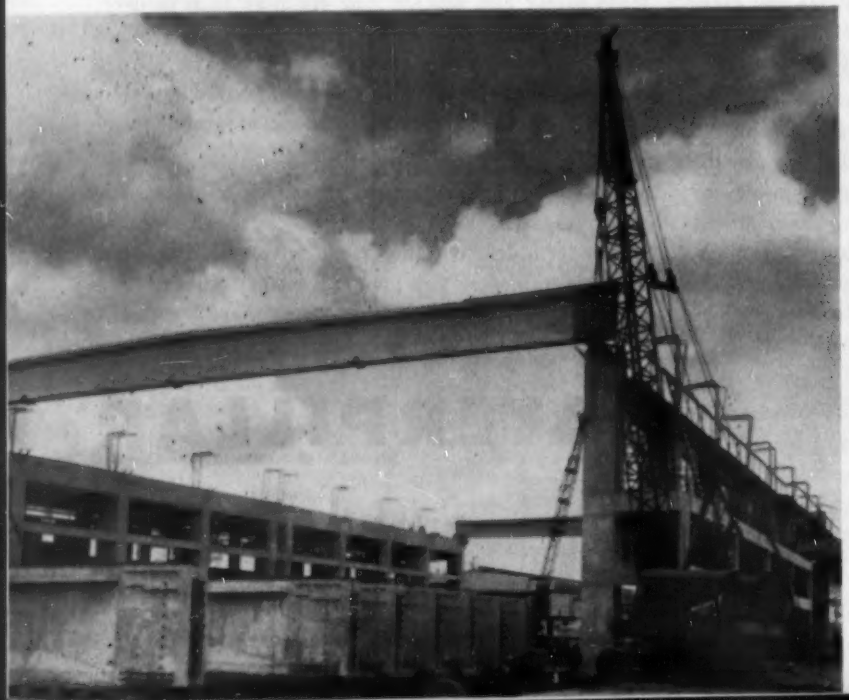


FORMS are plywood faced and braced by light steel frames. After prestressing rods sheathed in flexible metal hose are placed, the rest of the forms are positioned.



EXTERNAL VIBRATION with a pneumatic Viber clamped to the forms continues until concrete tops prestressing members.

GIRDER nearest the crane is ready to be jacked up so that a dolly can be slid under it. Then it will be rolled to the end of the track where cranes will make the lift.



HILL AFB . . .

Continued from page 74

few feet from the casting beds supplied concrete. Rubber-tired Buggymobile carriers hauled the mix in buckets, and a crane hoisted the buckets to pouring position. At the start of a pour, external machines vibrated the concrete. After the mix covered the prestressing tendons, internal vibration was used.

Erection

After the concrete had cured to 4,000 psi, the first two girders were stressed to about 65% of ultimate full stress. Then the first girder was jacked up and placed on dollies. Hand winches hauled the girder to the storage position where it was placed on steel pedestals.

The same procedure was followed for the second girder. It was winched over the first girder's soffit forms to storage position. All 10 girders were cast two at a time in this way. The last two were left in the casting position until moved for erection. While the girders were being cast and stressed, the contractor put up the rest of the building's frame.

Erection of the big girders took a week's time. Hoisting seemed simple, but Shurtleff & Andrews of Salt Lake City, subcontractor for this part of the work, planned the operation carefully. The first girder was hoisted direct from its storage position to rooftop level. Succeeding units were winched down the storage yard rails to the same hoisting position. Cranes were positioned for the first lift and left in that position until all 10 girders were hoisted.

Girder design required that the prestress load be balanced by the dead load at all times. So the girders could be handled with lifting connections only at each end. Dollies were hoisted with the girders.

At roof level, the girders were pulled along the building to final position by two winches driven by ½-hp motors. These motors were geared down from 1,750 rpm to 1 rpm. Speed of the movement was 16 in. per min at the start and 3 ft per min at the end as the ½-in. cables wound on their drums. Switches controlling the two motors were mounted on a small board so that one man could handle both winches and so control movement of the girders.

Trickiest part of this movement was to keep both ends of a girder

moving at the same speed to prevent a skew alignment. Binding of the flanges of the dolly wheels on the rails caused some difficulty in positioning the first girder. The flanges broke off after the first movement, and one set of wheels had to be replaced.

When each girder arrived at its final position, it was jacked up to permit removal of the dollies. Then it was jacked down onto its pedestals. Simplex 60-ton hydraulic jacks handled both this work and the prestressing.

Because of the unique nature of the construction operation, Jacobsen took out special installation risk insurance to protect against damage to the girders or the roof slabs during construction. Only major damage was covered—not chipping of the corner of a slab, for example.

The contractor placed this insurance with Pacific Employers Insurance Co. of Los Angeles who in turn placed the risk with Lloyd's of London. Premium rate was about 1% of value. The girders were valued at about $8,000 each and the roof slabs at about $400 each.

Stressing

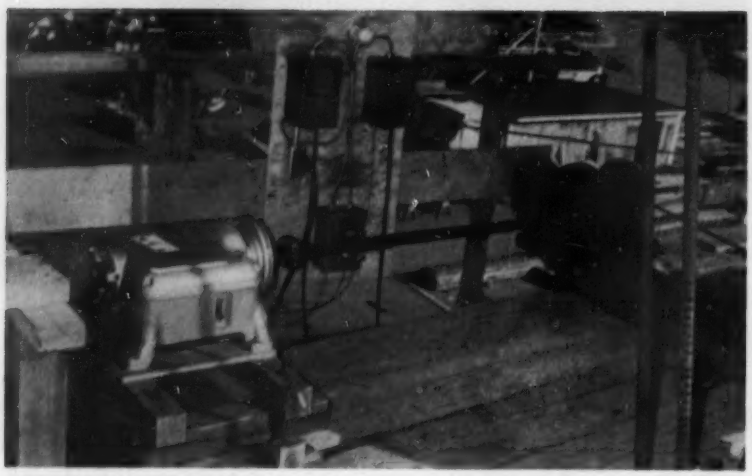
The girders were cast, stressed, and erected as simple beams. After the roof load is imposed, Jacobsen will apply additional stressing to bring internal stress up to its full design value. Then reinforcing steel projecting from the girders will be tied into column reinforcing and concreted to form a rigid frame structure.

(Continued on next page)

JACK lifts girder off its pedestal in storage position. Same Simplex 60-ton hydraulic jack and frame also will lift the girder off the dolly when final position is reached.

DOLLY, riding a rail mounted on an 18-in. I-beam, rolls under the girder. Lifting slings will be attached to pins in dolly.

LIFTING BEAM equalizes load handled by each P&H crane. Careful coordination by crane operators is key to hoisting operation.



POWER to haul girders along rails to final position comes from a Ridgid "400" gear-motor driving Beebe winch. Gear train cuts the 1,750 rpm speed down to 1 rpm.

SWITCHES for the two haul motors are mounted on one board to enable P. A. Maxwell, superintendent for Jacobsen Construction Co., to control both winches from one position.

HILL AFB...

Continued

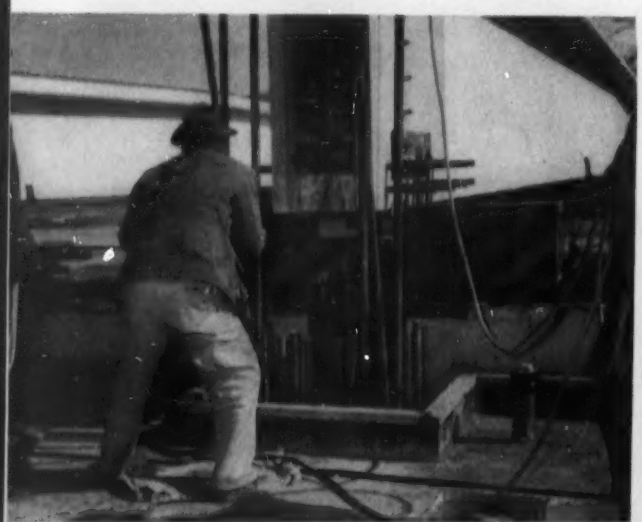
The reason for applying the stress in two increments is that the dead load of each girder is only 28% of the total design load. So if the total prestress were applied before full dead load was imposed, there would be a compression overstress in the bottom of the girder.

The total final prestressing force at the center of the span is 1,386 kips for interior girders and 1,155 kips for end girders. These forces are obtained by 18 and 15 bars respectively. Partial prestress is accomplished simply by stressing only 11 bars in the 18-bar girders and 10 bars in the 15-bar girders.

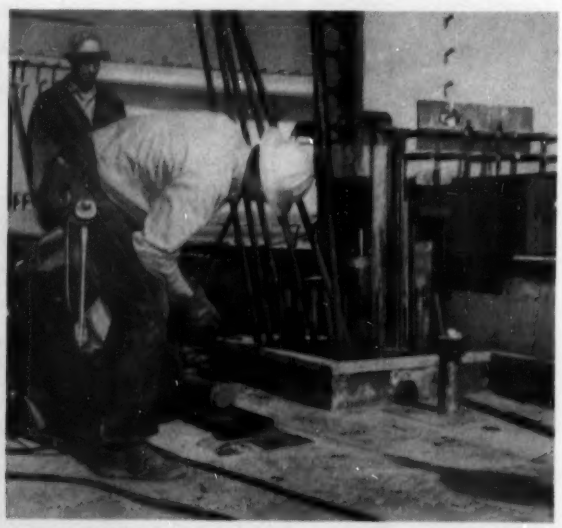
Initially, each bar is stressed to 96.6 kips and released to 92. Overstress and release reduce steel creep losses. Estimated loss due to creep, concrete shrinkage by plastic flow, and friction is estimated at 16%, so the final estimated force in each bar is 77 kips.

Depth of the girders vary from 6 ft 4 in. at the ends to 7 ft 6 in. at the center. After they are in place an additional 6 in. of concrete will add more depth for live loads.

The hangar is 274 ft long and is divided into two sections by rail-mounted doors. Width is 130 ft face to face of columns. It is a project of the San Francisco District, Corps of Engineers, Col. John A. Graf, District Engineer. Resident engineer for all Hill Air Force Base construction is Lawrence E. Fine. Superintendent for Jacobsen is P. A. Maxwell, and Jack Wheatley is engineer for the contractor.



FINAL POSITIONING of girder is a delicate job. Workman carefully spots girder pin over pin hole in supporting pedestal.



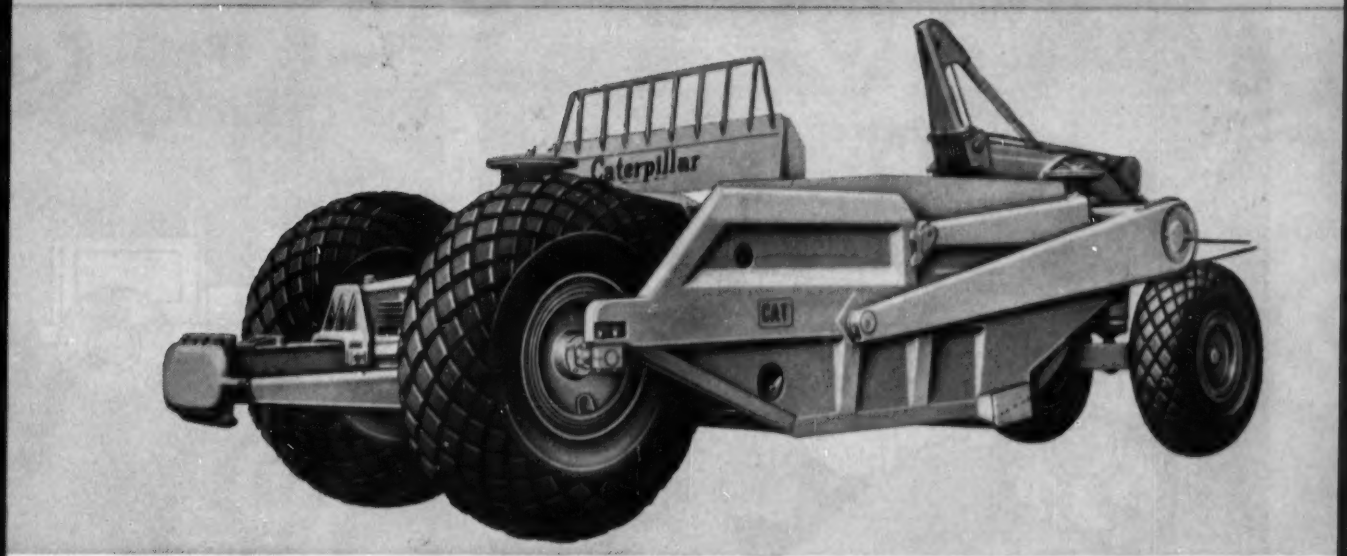
LAST OPERATION is to jack up the girder again to permit removal of dolly, then lower it into position on its pedestal.

ANNOUNCING CATERPILLAR'S

NEW NO. 463 LOWBOWL SCRAPER

(four wheel, crawler drawn)

25 cu. yd. heaped 18 cu. yd. struck



11 Reasons Why the No. 463 Delivers Bigger Loads at Lower Costs per Yard!

1. **Lowbowl design,** a new concept developed by and exclusive with Caterpillar, loads more material with less resistance clear to the end of the loading cycle.
2. **Large capacity** without using sideboards—25 cu. yd. heaped.
3. **Easy, fast loading** of full, heaping loads.
4. **Large apron opening** for speedy, easy ejection of sticky material.
5. **Positive 'dozer-type ejection** that sweeps the bowl clean and allows fast, controlled dumping.
6. **Flat bottom** for smooth, level cuts—excellent on any finishing job.
7. **Good digging action** with stinger bit.
8. **Wheels track within cutting edge** for level cuts.
9. **Adjustable rear axle height** that allows bowl leveling with unevenly worn rear tires.
10. **Rugged construction** with high-strength steels for long life, low maintenance costs.
11. **New tubeless tires** for greatly reduced tire maintenance costs.

For bigger production at lower cost on shorter hauls, here's a new CAT* earthmover—the No. 463, featuring Lowbowl design. From stinger bit to ejector, this new scraper is engineered to load, haul and dump with maximum efficiency. You can count on it to deliver top performance with a minimum of down time on your toughest job. For complete information about the No. 463, see your Caterpillar Dealer!

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

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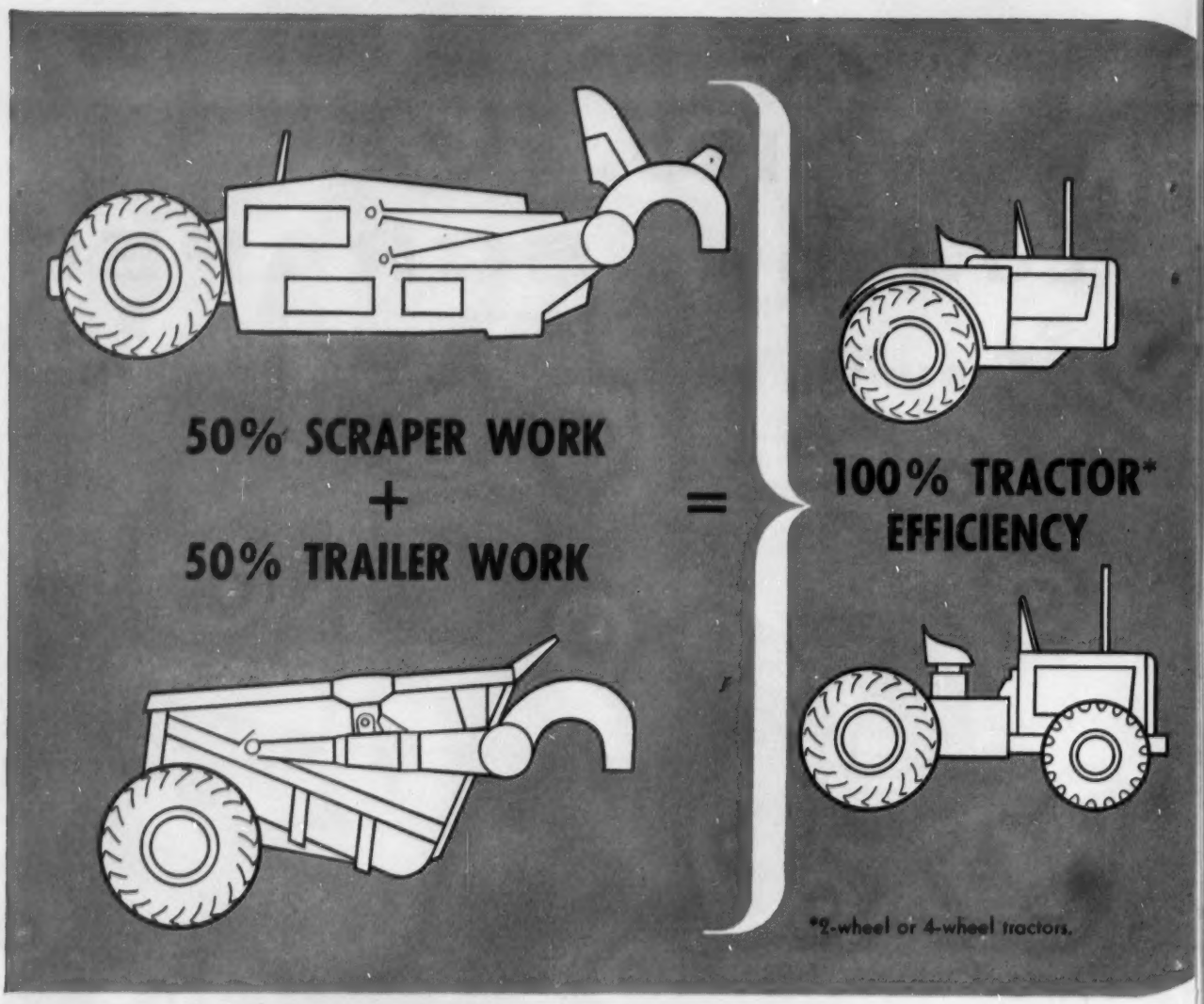
NEW NO. 463 SCRAPER—LATEST EXAMPLE OF CATERPILLAR LEADERSHIP IN ACTION



Scraper for dirt, Rear Dump Trailer for mixed materials — a complete team for any hauling job. Add the PR21 to your present tractor-scraper units for full efficiency of your tractors and a complete team for any job.

COMPARE THE INVESTMENT:

TRACTOR	SCRAPER	PR21	YOU SAVE THIS CAPITAL
TRACTOR	SCRAPER	TRUCK	

The diagram above shows the proportional investments required for a tractor-scraper-trailer team and a tractor-scraper plus truck. You save approximately ⅓ by adding the PR21 as against a comparable sized truck. And when you work the PR21, you work your tractor, too. 100% efficiency with the least possible investment.

DOUBLE THE USE OF YOUR PRESENT TRACTORS*

Athey PR21 Rear Dump Trailers interchange with Scrapers for complete job adaptability.

100% efficiency with your present 2 or 4 wheel tractors means big savings for you! With the Athey PR21 and a Scraper you have full coverage on any mixed material hauling job. Use the Scraper for dirt and overburden—the PR21 for rock and mixed material. Self-loading or shovel loading—you have the equipment to do the job. You save approximately ⅓ of your initial capital investment and get 100% tractor efficiency.

Conversion is easy and fast — no additional parts or attachments are needed. Additional savings can be realized by ordering the PR21 less tires and wheels and interchanging the Scraper tires and wheels.

The PR21 gives many advantages you can't get in comparable sized trucks — maneuverability with a 33½ ft. turning diameter, quick loading with a big target body and a low loading height, safety with a low slung design that keeps the load close to the road, fast 18 second dumping with simple, sure hydraulic controls, independent braking of tractor driver and trailer wheels, retracting wheelbase for working close to the fill or hopper. All these profit-packed advantages are yours with the PR21. Why tie up your working capital in limited duty trucks?

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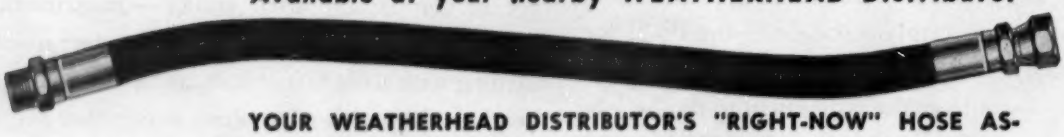

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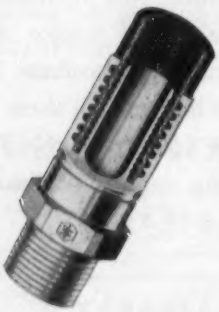

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The Engineer's Field Report

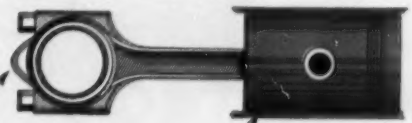
CASE HISTORY
LUBRICANT *RPM Delo Oils*
FIRM *Arizona Sand & Rock Co., Phoenix, Arizona*

Sleeve taper only .0045" after 150,000 miles hauling under tough conditions

This Mack tractor's 200 h.p. Cummins diesel went in for its first overhaul after four years hauling heavy equipment to and from Arizona construction jobs. The rig hauls loads up to 25½ tons in on-and off-highway work. Using RPM DELO Special Lubricating Oil since new, inspection after 150,000 miles showed oil return holes clear, all rings free and in good condition, maximum sleeve taper only .0045". Manley Johnston, Shop Foreman, Arizona Sand & Rock Co., reported, "The engine was really clean! It could have gone at least 50,000 more miles."
Arizona Sand & Rock, general contractors for road building projects and operators of a large plant, works its equipment in constant dust and grit...in desert and mountainous terrain. The company depends on RPM DELO Oils to give the protection these heavy-duty engines need under these tough conditions.

Why RPM DELO Oils reduce wear in heavy-duty engines

Detergent keeps parts clean...helps prevent piston scuffing. Special compounds stop corrosion of any bearing metal and foaming in crankcase.



Special additives provide metal-adhesion qualities...protect parts hot or cold, running or idle.

Anti-oxidant resists lacquer formation...prevents ring sticking.

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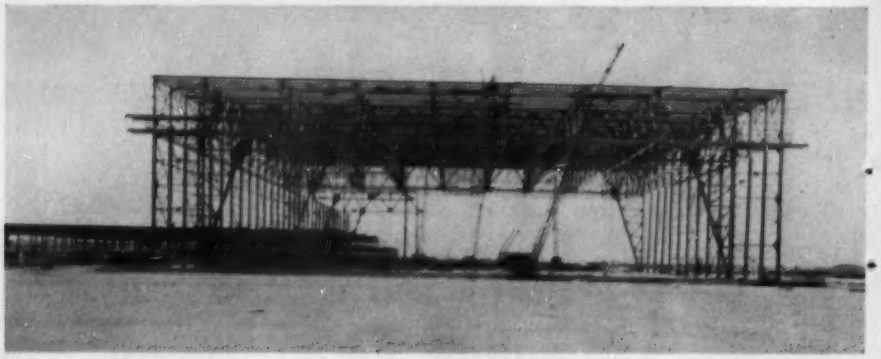


Rigid Trusses Frame Kelly AFB Hangar

A ONE-STORY HANGAR covering more than 23 acres is nearly ready to go into full operation after a whirlwind construction campaign.

Built at Kelly Air Force Base, Texas, for $13 million, it's the world's largest and most modern maintenance and repair hangar. The main building is 300x2,000 ft, and an adjoining shop area is 250x1,650 ft. Besides the hangar, the job included 300,000 sq yd of concrete apron and miles of underground piping.

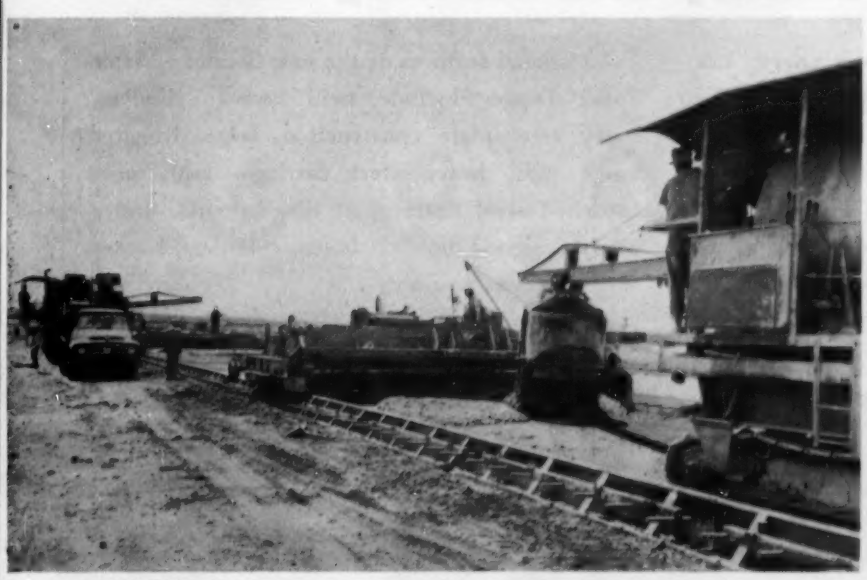
Farnsworth & Chambers Co. of Houston, Texas, built the hangar from plans drawn by the Kiljian Corp., Philadelphia, Pa. The contractor started one crew on underground utilities and another on grading. Sewage and drainage pipe ranged from 12 to 78 in. For the larger sizes, he brought in a Buckeye ditcher and a Bucyrus-Erie crane. His men trenched, laid, and backfilled an average of 375 ft a day. The trench was 5½ ft wide and 22 ft deep.

Meanwhile, the contractor was removing about 90,000 sq yd of existing 8-in. pavement. He mounted a Mighty Midget breaker on the back of a truck and powered it with a 210 cfm compressor. Broken pieces were loaded into

(Continued on next page)

SPRAWLING STRUCTURE at Kelly Air Force Base consists of 300x 2,000-ft hangar with 250x1,650-ft shop. Surrounding apron requires 300,000 sq yd of concrete pavement. New facility will offer production line maintenance for all types of aircraft.

CONCRETE PIPE is laid in 5½-ft wide trench cut by Buckeye ditcher. Contractor trenches, lays, and backfills an average of 375 ft a day. Trenches average 22 ft deep.



PAVING SPREAD averages 2,800 sq yd a day. Three Koehring pavers place concrete in 25-ft strips 16 in. thick. Blaw-Knox spreaders with 18 vibrators follows closely behind.

KELLY AFB HANGAR . . .

Continued from page 84

trucks by a Caterpillar No. 6 loader. When the old pavement was removed, a fleet of six scrapers graded the area.

The next big job was drilling 746 foundation caissons. A. H. Beck Foundation Company brought in two rigs to drill holes ranging from 18 to 60 in. in dia and averaging 60 ft deep. One rig drilled, and the other belled the bottoms. Reinforcing cages were lowered into the shafts, and then concrete was placed in a continuous pour.

Paving

Large scale paving started as soon as suitable areas were prepared. Concrete was placed in 25-ft strips 16 in. thick. Three Koehring dual-drum pavers led the paving spread. Two laid the bottom 12 in., and a third paver poured the top 4 in. over welded wire fabric. A Blaw-Knox spreader struck off the mix and also pulled a Fergusen rig with 18 vibrators. Following the spreader were a Jaeger-Lakewood finisher, a Koehring bull float, and a Heltzel curing machine. Production averaged 2,800 sq yd a day.

Batching facilities consisted of Johnson cement and aggregate bins charged by a 2-yd Bucyrus-Erie clamshell.

Steel Erection

Most spectacular part of the job was the erection of the main hangar. Its huge structure was designed as five independent bays 300x40 ft. In each bay, longitudinal double cantilever trusses spaced 36 ft apart rest on a pair of rigid truss frames 250 ft apart.

To handle the big erection job, American Bridge Division of U. S. Steel Corp. brought in four Manitowoc cranes—two 60-ton and two 35-ton units.

Erection started on a rigid truss frame at one end of the hangar. One of two stiff legs was assembled on the ground. It was erected by a pair of 60-ton cranes and held in position by guy wires and a falsework bent equipped with two 50-ton journal jacks.

A second falsework bent, equipped with two 300-ton jacks, was erected near the stiff leg to receive an assembled unit of the rigid truss frame. This operation was repeated on the rigid truss frame 250 ft away, and the two were tied together with the two

(Continued on page 87)

New! The Sherman Major Power Digger

with Many Advanced Features to Increase Versatility and Earning Power

The all new Sherman Major Power Digger has been engineered to take full advantage of the ruggedness and economy of the Fordson Major Diesel Tractor. This heavy-duty unit will dig 12 feet below grade, reach 18 feet 3 inches behind the tractor rear axle, dig throughout a swing arc of 180° and will carry a full bucket to a height of 8 feet 8 inches for loading trucks.

Additional features of the new Sherman Major Power Digger include twin crowd cylinders, heavy steel plate construction, large diameter hinge pins, heavy steel castings, replaceable hardened steel bearings at hinge points, and a newly designed dipstick, boom, cylinders, bucket and sub-frame assembly.

Write for bulletin No. 841.

See the Sherman Major Power Digger soon at your local **FORD TRACTOR DEALER**

Sherman
PRODUCTS, INC.
ROYAL OAK, MICHIGAN
POWER DIGGERS* • FRONT END LOADERS • FORK LIFTS

*Designed, Engineered and Manufactured jointly by Sherman Products, Inc., Royal Oak, Michigan. Wain-Roy Corporation, Hubbardston, Mass.

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KELLY AFB HANGAR . . .

Continued from page 85

double cantilever trusses immediately over the stiff legs.

When the ends were erected on the cantilever trusses, crews shifted to the opposite ends of the rigid truss frames and erected the two stiff legs. The remainder of the two trusses was filled in, and the connections were made by a jacking at the falsework bents. Erection of double cantilevers followed until the entire bay was completed. All four bays were erected in this manner.

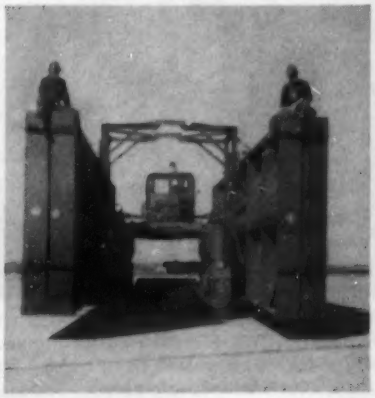
One of the chief reasons for the speed of erection was the use of two straddle trucks to handle steel at the yard and to haul it 1½ mi to the erection site. American Bridge operated two units—a 22½-ton Ross carrier and a 15-ton Hyster straddle truck. Together, they lifted and hauled pieces weighing up to 34 tons. Equipped with a special frame, the Ross carrier could haul two steel doors weighing 22 tons. At the yard, the doors were attached to each side of an inverted U steel frame. The straddle truck simply drove into the frame grabbed it with special brackets on its lifting arms, and hoisted the heavy unit off the ground.

Besides speed, the straddle trucks had other advantages. They eliminated at least two cranes, ten trucks, and a sizeable crew of men. They were in constant demand at both yard and hangar.

Personnel

J. E. (Jesse) James was superintendent for Farnsworth and Chambers Co., Inc., and C. W. Edwards was chief resident engineer for the Kuljian Corp.

TRUSS SECTION of rigid frame hangar is hoisted into position by two Manitowoc cranes. Falsework bent supports one end until complete truss is erected. Trusses are 250 ft apart.



22-TON DOORS are hauled on special frame that straddles straddle truck.

LONG STEEL MEMBER weighing 34 tons is carried by Ross and Hyster straddle trucks. Versatile rigs eliminate yard cranes and a fleet of trucks for hauling to site.

(Advertisement)

SWINGING 18-YARD CABLE-DUMPED, TANDEM-AXLE SEMI-TRAILERS, these rugged GMC Diesels haul away 21 tons of clay at a clip—right to the limit of the Michigan weight laws. This 70,000 GCW model is one of a complete line of GMC Blue Chip heavy duties meeting every hauling need in the 59,000 GVW-90,000 GCW range. Especially designed for tough construction jobs, these new GMC's are *extra-stamina-engineered* — are equipped with new oversized axles. When required for exceptionally severe service, full-length channel frame reinforcements are obtainable as a factory-installed option.

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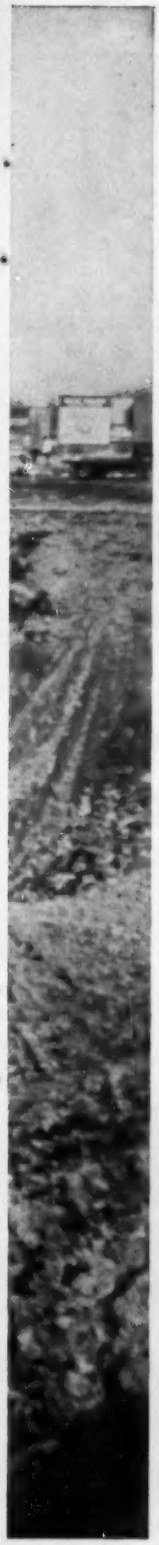

"Our 10 GMC Diesels hauled 1 million yards in 2½ years—with engine maintenance of only $40 a truck!"

Sugden & Sivier have worked some of Detroit's biggest construction projects. One of the toughest was hauling away 400,000 yards of soggy blue clay on the John C. Lodge Expressway job. To keep things moving, every load had to be heaped right up to Michigan's 70,000 GCW limit. And five of the ten miles to the dump point were through fuel-eating city traffic.

Clearly, Sugden & Sivier had to have trucks that could take a lot of punishment—keep rolling—keep costs down. Past experience gave the nod to GMC Diesels. So their bid was based on the expected performance of 10 new tandem tractors they stood ready to order.

"We knew GMC's could handle the oversize loads," says Grant L. Sivier. "We've never seen anything like them for sheer brute-strength. Yet there's not an ounce of 'fat' in their design to waste our allowable road-weight. And it was GMC Diesels' economy that let us bid as low as we did."

Actually, the 10 new GMC's did even better than expected. Over the entire first year of use, engine repair costs averaged just $11 per truck. And fuel mileage—despite the 42,000-lb. loads and stop-and-go traffic work—was a smart 4.7 m.p.g.

Today—2½ years later—Sugden & Sivier's GMC Diesels *still* deliver 4.7 m.p.g. They've each hauled 97,500 yards of payload—clocked about 100,000 miles apiece. Yet total engine maintenance costs of all 10 trucks still come to less than $400.

Want economies like these on your jobs? There's a cost-cutting GMC Blue Chip tandem—gasoline or Diesel—engineered for any truck-work up to 59,000 GVW-90,000 GCW. Check your requirements *now*—with your GMC dealer!

GMC TRUCK & COACH—*A General Motors Division*

TOP TONNAGE AND TIGHT SCHEDULES ARE NO PROBLEM to this fast-stepping GMC Diesel. Its power comes from a new cost-cutting *2-cycle* Diesel engine—one of a great new line of Blue Chip power plants engineered to take the toughest truck-work in stride. They include a wide choice of gasoline and Diesel models.

AT WORK ON AMERICA'S TOUGHEST JOBS, Blue Chip GMC's are chalking up standout performance records—and earning record profits—for many a leading contractor. Extra-powered engines—extra-capacity axles—and extra-tough construction throughout—make these GMC's the top choice for punishing jobs.

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Goes most anywhere . . . tows own air power
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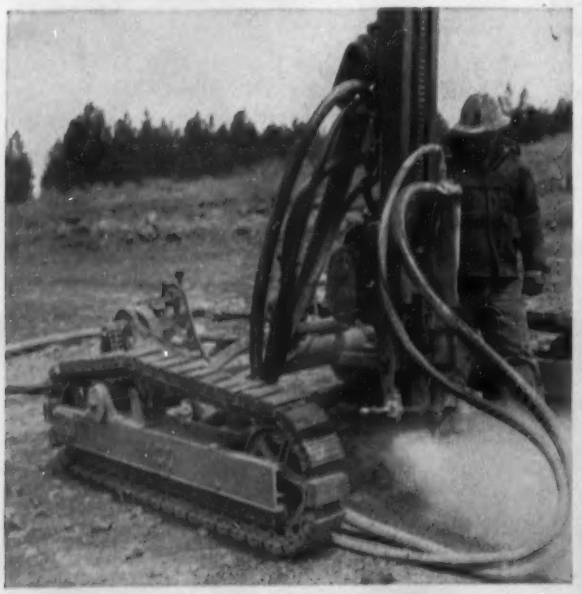

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2. CENTERFIT is more flexible in operation than any standard IWRC rope.
3. CENTERFIT has unsurpassed resistance to shock loading.

Over the years CenterFit has built a record for outstanding service life on the toughest applications such as shovel hoist ropes, back hoe pull ropes, and clamshell holding and closing lines where overloading is a factor. Contact your nearest J&L Office or representative.

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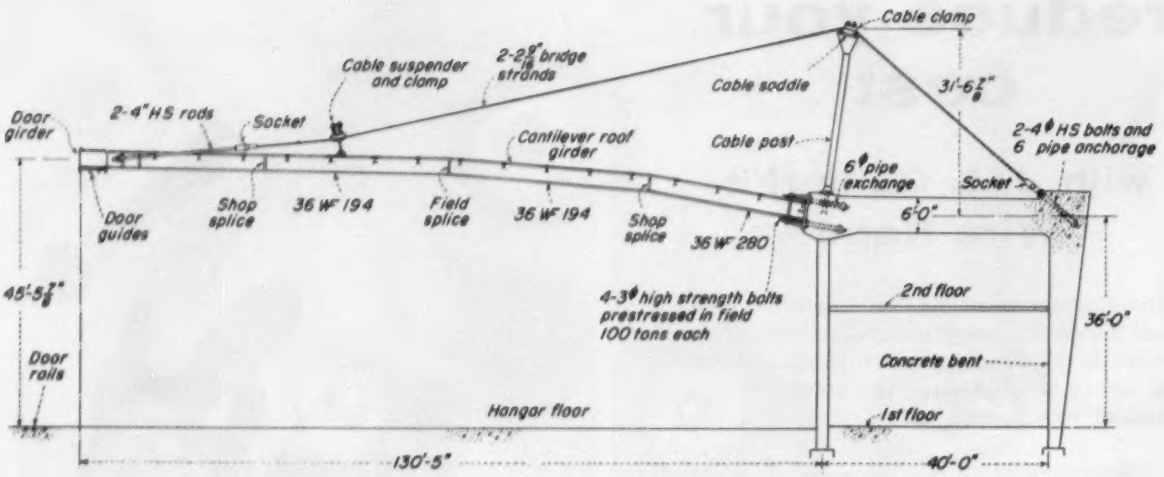


Section thru Hangar

UNIQUE DESIGN of $1.5 million hangar under construction at Philadelphia International Airport creates a series of unique construction problems. Most unusual is finding way to support structural roof until suspension cables can be placed.

New Type Suspended Roof Hangar Gives Birth to New Job Methods

IT'S A CHALLENGE to a contractor's skill to erect a structure that is the first of its kind. That's because new designs often demand new construction methods that have to be worked out on the job.

The unique, one-sided, suspended roof hangar under construction at Philadelphia's International Airport is such a job. Building it is a severe test of the skill and ingenuity of Baton Construction Corp. of Philadelphia, general contractor, and Lehigh Structural Steel Corp. of Allentown, steel erector.

What is a one-sided, suspended roof hangar? Simple enough. It's a hangar whose roof juts out in one direction from a series of concrete bents and is supported by steel cables attached to the bents. There are 10 bents in this one, spaced 30 ft apart. These are connected by concrete spandrels at second and roof floor levels. Cables run from anchors in the bents, over steel saddles, and down to anchors set at the tip of the suspended span. Semi-rigid connections join roof girders to bents.

Baton first drove 12-in. WF 55-lb steel piles to support the structural concrete part of the hangar and the bent columns. A cluster of 10 piles supported each load columns; 4-pile clusters tie down each uplift column. Piles not used for bents were capped with concrete and connected with a concrete grade beam.

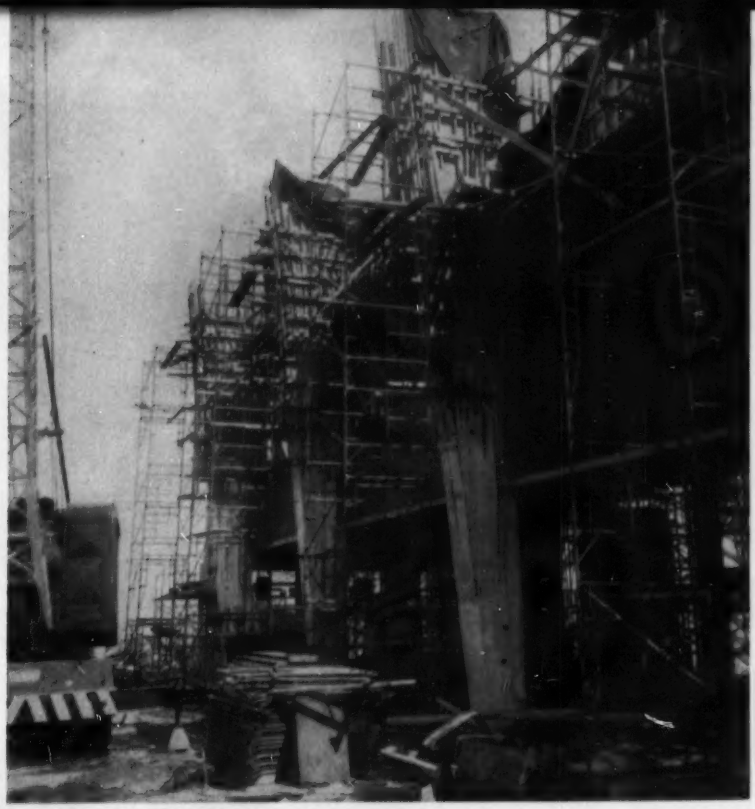
Once the foundation was in, Baton formed simultaneously for bent columns, slab beams, slabs, and spandrels from first to second-floor level. The contractor used plywood forms for all concreting except the slabs which were of grid construction. Here Baton used Beaver-Advance tubular scaffold frames with adjustable heads. These were placed in continuous rows and topped with 4x6-in. wood stringers that later were crossed with 4x4-in. wood joists. Over the joists Baton placed plywood soffits 2 ft wide to serve as nailers for metal pan forms.

Engineers designed the second floor slab to be supported by 2-in. dia steel rods suspended from connecting beams of the concrete bents overhead. But this slab had to be poured before erection of the bent beams. Baton solved the problem by placing the hangar rods into the second floor slab beams and letting them stand freely upright until work reached roof level. Tops of the hangar rods then could be inserted into the beam forms and concreted secure with the beams.

Concreting of the first to second floor columns, spandrels, and slabs was done by crane and bucket. For the slab, a hopper was set up to feed concrete to rubber-tire buggies.

After concrete was cured, workmen stripped all but slab forms and moved them up to the second floor to roof section. Tubular scaffolds that shored the second floor slab were left in place to support the slab until it could be hung by rods to the bent beam overhead. Baton used additional scaffold frames for the roof slab. Stringer, joist, soffit, and pan forming remained the same as for the second floor.

Cable anchors were placed during forming of the connecting bent beams. Baton placed 4-in.-dia studs 11 ft long into the uplift columns to anchor the cable ends, set posts 28 ft high into the load columns over which the cables



SCAFFOLD TOWERS set up in front of each uplift column of concrete supporting bents speed forming and stripping. Tubular scaffold frames also are used for slab forming

CABLE ANCHORS in supporting bents are 6-in. dia pipe sleeves which will receive cable.

would ride, and drove four 3-in. dia high strength bolts into each load column to anchor the inboard ends of suspended roof beams.

Construction is nearly complete on the concrete portion of the hangar. Work will begin this month on the trickiest part of the job—suspending the roof hangar. This portion will be Lehigh's job.

Principal members of the roof will be 36-in. WF 194-lb beams, 130-ft long, that will cantilever out from the concrete bents. Each member will be made up of four sections. Workmen will weld these into two pieces at the shop and join them in the field into a continuous rib.

Lehigh first will set up an erection tower to support two beam ends during the suspending operation. Two screw jacks set on the tower tops will raise and lower the outboard ends of the beams during adjusting of the suspension cables.

A crane will lift the first steel member so that its outboard end will come to rest on one of the jacks and its inboard end will be arrested by the high strength bolts previously placed in the bents. Nuts then will be placed and bolts prestressed to a 100-ton load. Prestressing will put a load on the bolts equal to the roof load and prevent later movement of the bolts in the concrete.

Prestressing will be done by a bolt yoke and jack system. Workmen will place the yoke around the bolts and set a jack between the yoke and the concrete bent. Then, using the bent as reaction, the jack will exert a 100-ton load. While the load is being applied, the nuts will be tightened. Yokes and jacks then will be removed, and workmen will begin placing cable assemblies.

Two 2 9/16-in. steel bridge strands 150 ft long will support each beam. These have a breaking point of 392 tons, determined by tests with sample lengths of cables. Cables are prestressed during manufacture to remove the structural stretch that would occur during service conditions. Workmen will attach the outboard end of each cable to the tip of the 36-in. WF beam by a 4-in. dia stud, 30 ft long, fitted with a socket to receive the cable end.

Once secure, the cable then will run up and over the cable post and anchor to a second 4-in. dia stud, 11 ft long, in the uplift bent column. The length of the cables will be adjusted with the help of jacks set on the erection towers to bring the roof tip up to its proper elevation. Sockets provided at each cable end will shorten or lengthen the cable as required.

After the adjacent beam is set in the same way, the two beams will be connected by diagonal 10-in. WF braces. Towers then will be moved and a second two-beam section erected. This will continue until all 10 beams are placed.

Sudden changes in temperature during cable placing could prove a hazard. Precautions will be taken against expansion or contraction of the cables caused by the temperature changes. Should the average daily temperature drop more than 20 deg, elevations for the outboard end of the roof will be increased ¼-in. for each 20 deg change. Should temperatures rise, the elevation will be lowered ¼ in. for each 20 deg rise.

On completion of steel erection, pre-cast channel tiles will be placed for the roof and covered with 1½ in. of insulation and built up roofing. Hangar doors and curtain walls will be supported by the roof.

The steel and concrete structure, when completed at a cost of $1.5 million, will be occupied by TWA. Ballinger Co. of Philadelphia, designed the hangar. Amman and Whitney of New York were structural engineers. Henry C. Weiss is Baton's general superintendent.

With crews working around the clock to meet a tight schedule . . .

First Snake River Dam Gets Off to a Flying Start

A FAST-PACED construction job is moving into high gear in the Hell's Canyon stretch of the Snake River between Oregon and Idaho. There Morrison-Knudsen Co., Inc., is building $63 million Brownlee Dam, the first of three big hydro projects planned for Hell's Canyon.

The Federal Power Commission approved Idaho Power Co.'s application to develop the Brownlee site Nov. 10. M-K crews moved in swiftly. Now 500 men are on the job, working three shifts, and there will be 1,000 men at work by June.

Already progress is substantial. Glenn C. Johnson, M-K's resident manager, and his men have built access roads, established base camp facilities, completed a 600-ft steel girder bridge, excavated 500,000 cu yd of rock and earth in upstream and downstream diversion channels, each 50 x 100 x 800 ft, started work on a diversion tunnel 40 ft in dia and 2,540 ft long, and pushed work on upstream and downstream cofferdams.

A tight schedule calls for diversion of the river by late May and closure of the two cofferdams by mid-summer. Then, M-K will begin excavating through 105 ft of riverbottom to bedrock and start building the impervious clay core of the dam. Another upstream cofferdam will be built to hold back the river's flood crests in 1957.

Brownlee is 8 mi from the nearest railroad. To reach the site, M-K built a road down an abandoned railroad right-of-way on the Oregon side and carved through 4 mi of rock on the Idaho bank. The

(Continued on page 99)

WORK CAMP on the Idaho bank is headquarters for more than 500 men on the job.

Cuts downtime, labor, and grease costs up to 60%...

TOUGHEST CHASSIS GREASE EVER MADE

New Purelube Heavy Duty Chassis Grease lasts up to 2½ times longer than other chassis greases

As a fleet owner, you know the importance of keeping your rigs rolling for lowest cost. But have you heard about the chassis grease that helps three ways? It's the new Purelube Heavy Duty Chassis Grease . . . so tough it saves you up to 60% on downtime, labor, and grease for chassis lubrication.

Rugged field tests show this new grease stays on the job up to 2½ times longer than other chassis lubricants. Never splatters out. And that means: 1) 60% less equipment downtime for chassis greasing; 2) 60% fewer man-hours required for chassis lube jobs; and 3) a 60% lower lube bill when you switch to Purelube Heavy Duty Chassis Grease.

Now we want to prove it to you on your own equipment, on your own job site.

Just try this: Lubricate one of your vehicles with the new Purelube Heavy Duty Chassis Grease. Use any competitive grease you choose on a similar piece of equipment working side by side. Keep a record of the two vehicles and see for yourself the results of your own on-the-job comparison.

Mail the coupon or call your nearest Pure Oil office for a free demonstration on your own equipment. (Offer limited to fleets operating in PURE'S marketing area.)

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Sales offices located in more than 500 cities in PURE'S marketing area

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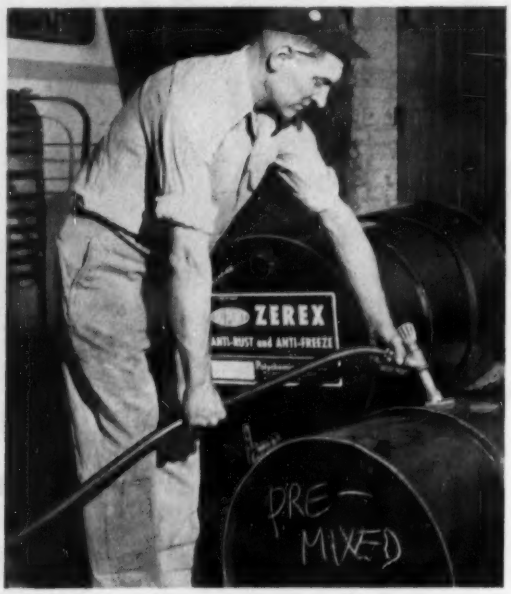
How the Du Pont Anti- save you work,

1. Pick the best!

Photograph above shows why your costly equipment is safest when you winterize with Du Pont Zerone® or Zerex® anti-freeze.

Flask "A" contains a solution of ordinary anti-freeze with an oil inhibitor. Flask "B" contains a solution of "Zerex" with Du Pont's exclusive chemical inhibitor. To each was added the same amount of ground rust. Flasks were shaken and contents poured. Notice how film of rust clings to the inside of Flask "A" just as it would to cooling system. But Flask "B" with "Zerex" is clean—rust particles stayed in suspension—drained out with the solution. Du Pont's chemical inhibitor will never form an oily film of rusty sludge that could clog radiators, causing overheating and serious engine damage.

This is just one of the many advantages you get when you protect your equipment from freeze-ups, rust and corrosion with either "Zerone" or "Zerex" anti-freeze. Pick the Du Pont anti-freeze best suited to your needs and you have taken the first step in the anti-freeze preventive maintenance plan—that will save you work, time and money.



2. Pre-mix your anti-freeze

Both "Zerone" and "Zerex" will mix completely in water, and the rust inhibitor will not separate from the solution while standing. This permits you to pre-mix your anti-freeze solution to any degree of protection desired for use when and where you need it.

Stock your pre-mixed anti-freeze in any convenient place. It will keep indefinitely—always ready to use.

When anti-freeze is pre-mixed, installations can be made rapidly by unskilled help and without the need for individual time-consuming hydrometer checks. What's more, guesswork and the chance of costly overprotection are avoided—and pilferage problems are discouraged.

Take advantage of the total savings possible when you pre-mix with Du Pont "Zerone" or "Zerex"—the quality anti-freezes that can be pre-mixed with water to stay!

Freeze PM Plan can time and money!

PREVENTIVE MAINTENANCE

3. Use the "Zerex" Test Kit

Thousands of dollars' worth of equipment is ruined each year because winter-worn anti-freeze is left in the cooling system to turn acid and cause rust and corrosion.

Now for the first time Du Pont makes it possible for you to tell – right on the job – which "Zerex" anti-freeze solutions are safe to re-use and which are worn out and should be replaced with a fresh "Zerex" solution. In this way, you can reduce cooling system maintenance expense and cut your "Zerex" anti-freeze costs in half!

And remember, *only* "Zerex" anti-freeze can be safely analyzed – on the job – with the exclusive "Zerex" Anti-Freeze Test Kit. This new method for testing reserve alkalinity in "Zerex" anti-freeze is a development of Du Pont research. It helps make possible an anti-freeze preventive maintenance plan that will save you anti-freeze and cut your operating costs.

Your best anti-freeze buy!

Note to maintenance supervisors and anti-freeze buyers: When you consider the value of the equipment you use, the investment your anti-freeze must protect and the expense of needless downtime, an efficient anti-freeze preventive maintenance plan makes good business sense.

The continuing savings made possible with "Zerone" and "Zerex" and an Anti-Freeze PM Plan far outweigh any momentary saving you might gain by using anti-freeze products of questionable performance and low initial cost.

Contact your Du Pont anti-freeze supplier or mail the coupon today – start saving now with the Du Pont Anti-Freeze PM Plan.

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BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

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"Zerone"-"Zerex" Section, Nemours 2420
Wilmington, Delaware

Please send more information on the Anti-Freeze PM Plan

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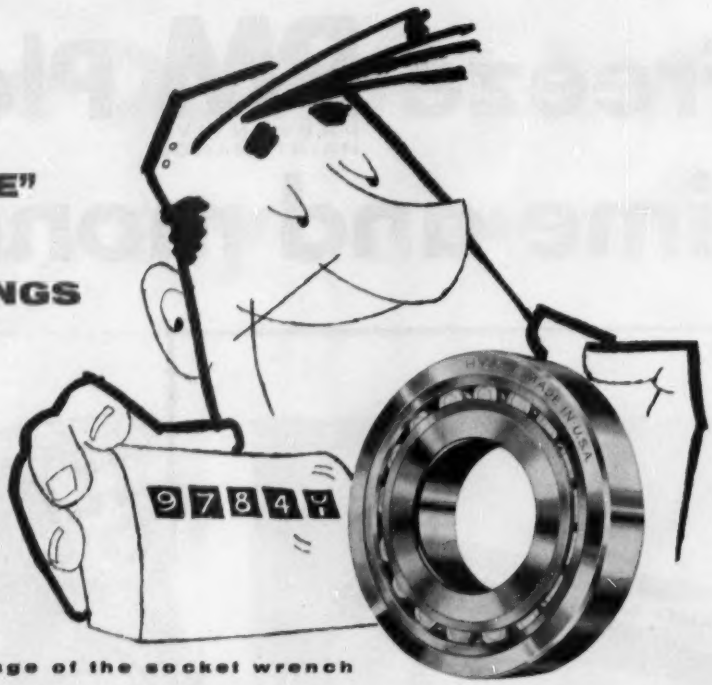
*Address*_____

*City*_____ *State*_____

*Company name*_____ *Title*_____

HOW TO GET MORE "MILEAGE" FROM YOUR ROLLER BEARINGS



by HY WHEELER, the sage of the socket wrench

The way you *install* a roller bearing has a lot to do with the service life you can expect from it. Here are a few tips that can save you money, time and trouble in the long run:

1. Make sure the shaft seat and housing bore are *clean*, *smooth*, and the *right diameter*.

2. *Don't* remove bearings from the package until you're ready to install them.

3. *Lubricate* the surfaces of the bearing and machine part which are to be press fitted.

4. Start bearings on shaft with rounded corner radius of race *going first*.

5. Direct the driving pressure *straight and square* through the race to be press fitted.

6. Drive races solidly up against shoulder of shaft and housing, but *never* hammer directly on races.

7. **BE SURE THE ROLLER BEARING YOU INSTALL IS A GENUINE HYATT. When you mount a HYATT correctly you're sure of maximum "mileage"! Hyatt Bearings Division, General Motors Corp., Harrison, N. J.**

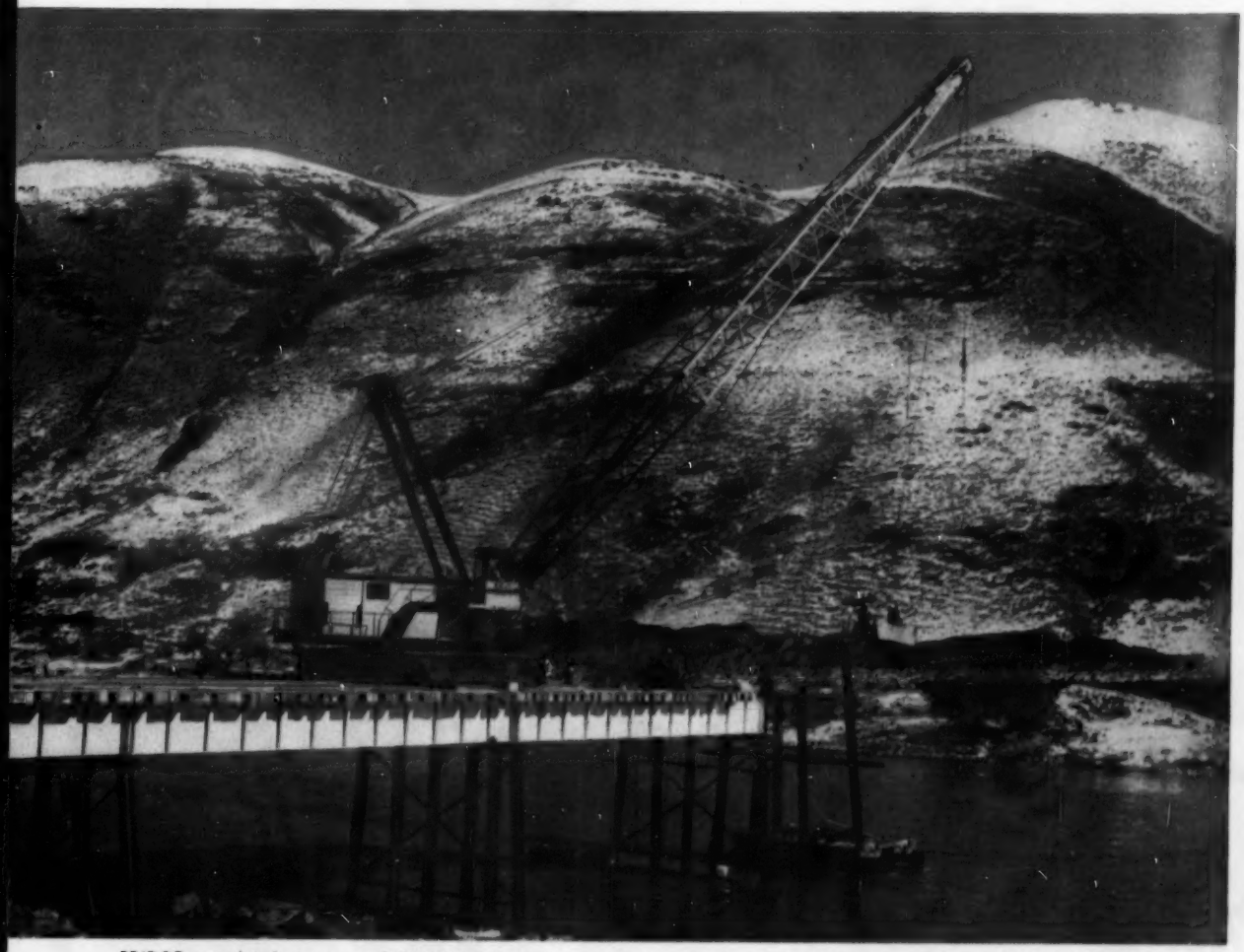
Remember, when it comes to quality, there's no substitute for...

AVAILABLE THROUGH UNITED MOTORS DISTRIBUTORS

GM PARTS SALES

HYATT ROLLER BEARINGS

STRAIGHT ○ BARREL ○ TAPER ○



BRIDGE, completed at a cost of $240,000, links work sites on the two banks of the river. It will permit easy transfer of materials and equipment during the two and one-half year work schedule. Here a Manitowoc 4500 crane drives piling.

TRUCKS ROLL day and night moving excavation from upstream and downstream diversion channels and placing fill in the two cofferdams. These are 17-cu yd Euclids.

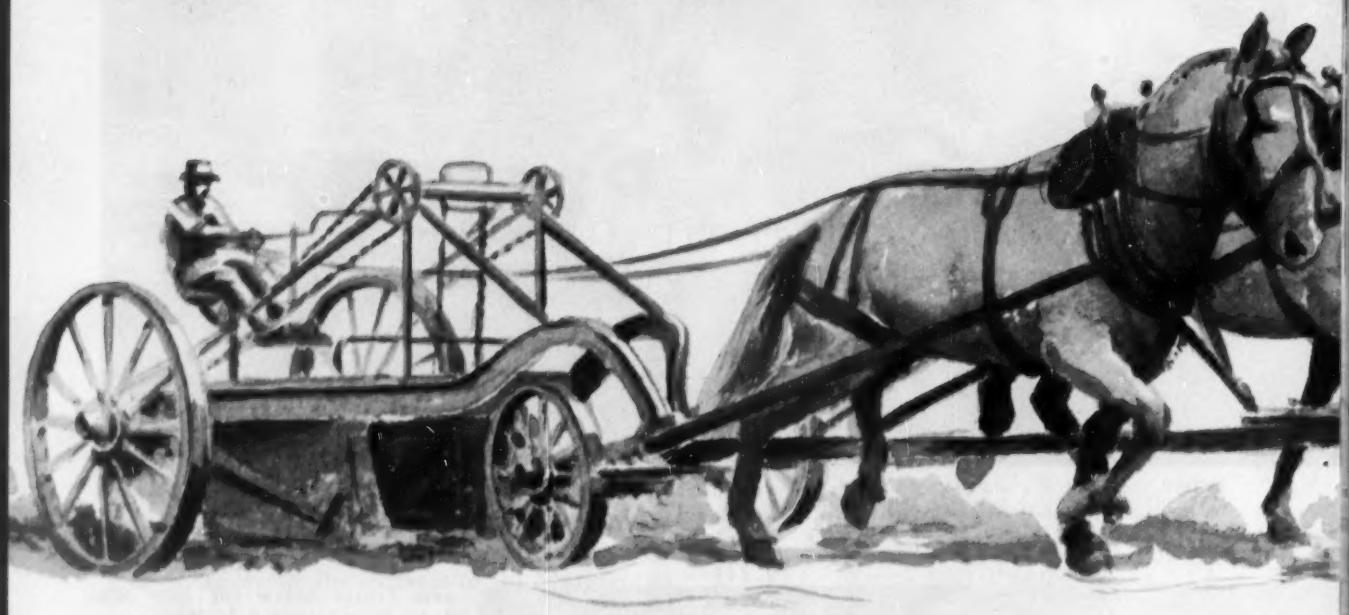
new bridge below the dam site links the two access roads.

Brownlee Dam will rise 395 ft, and its crest will stretch 1,320 ft across the canyon. It will have 360,000 kw of installed capacity in four generating units, with space for a fifth. The powerhouse will be on the Idaho bank; the spillway, on the Oregon side.

Work camps on both sides of the river are well advanced, and bulldozers have levelled a site for a rock crushing plant and a concrete batching plant on the Oregon bank. Concrete for the powerhouse on the Idaho side will be hauled across the bridge.

Idaho Power Co. also holds an FPC license to build a second dam at the Oxbow site, 13 mi below Brownlee. And it has plans, not yet approved by the FPC, for a third dam 23 mi down-stream.

Your tractor is the WHEELHORSE of your equipment fleet



Each earthmoving job has certain characteristics that necessitate the use of certain specialized abilities of your equipment. The kind of materials, length of haul, conditions underfoot, time limitations, and other important factors, all have a direct bearing on your equipment selection.

Take heavy-duty earthmoving tractors, for example. Your requirements of a tractor today are entirely different from those of only a few years ago. You used to evaluate tractors strictly on drawbar pull or push — a combination of engine horsepower and the amount of traction developed. Only these two dimensions — *power* and *traction* — were considered important. These two dimensions gave the necessary performance to load yesterday's scrapers in yesterday's fleets. They handled a good share of clearing and pioneering with considerable saving in explosives; they dozed and finished grades in work areas of their day, and there was time to move them to other heavy-duty assignments as needed.

But today's larger jobs, shorter time restrictions, and increased cost of labor, have added *two more dimensions* to your tractor requirements. These extra dimensions are *speed* and *mobility*.

Wider right-of-ways and longer construction job-units increase job-travel area. Wider grades and shoulders, better drainage, add yardage to be moved. Shorter completion time calls for faster movement. Because of reduced grade tolerances there is more and longer-haul dirt, more variation in equipment requirements from one job section to the next. Time limits and continual increases in labor costs call

for closer scrutinizing of minor recurring delays for turning, spotting, loading, spreading, clean-up, and moving between assignments, all of which used to be relatively unimportant.

So, today, the buyer must project each tractor's application ability into *all four dimensions*... power, traction, speed and mobility... in order to determine which of today's improved tractors will give him the greatest return on his investment.

Track-type tractors can capitalize fully on two of these dimensions — power and traction. These two dimensions have, in the past, become so universally well-recognized that a wide selection of track-type tractors, ranging in size to 416 engine horsepower, are offered by various manufacturers.

A few of these present-day heavy track-type tractors, to a limited extent, approach the third dimension — speed — in their work range. But a big track-type tractor that successfully utilizes the fourth dimension — mobility — isn't available to meet today's needs.

Yet these third and fourth dimensions of *speed* and *mobility* have become of major importance in equipping present-day and future earthmoving projects for production capacity, time-completion ability, and profit opportunity.

The following pages detail the place of all four dimensions in today's tractor work. Note that each dimension fills certain specific requirements of your today's operation which will become even more important as present trends progress into the future of expanded earthmoving.

before you buy, check all four dimensions . . . see next page

Dimension 1

POWER

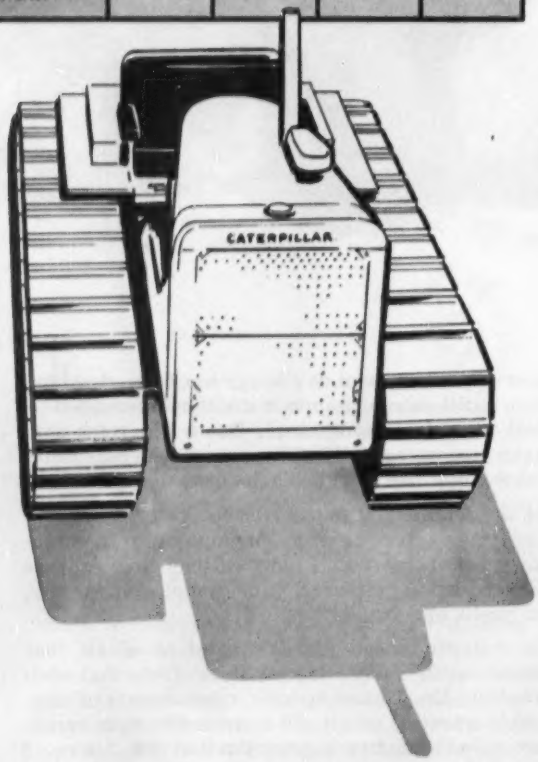
Compare engine horsepower... but as a source, not a "force"...

Adequate power is as important today as it was for yesterday's earthmoving. It must be measured today, however, not only by its ability to "bull" out a load, but by its ability to move the largest possible loads, at the highest possible speeds, in the wide spread of haul-range assigned to present-day earthmoving.

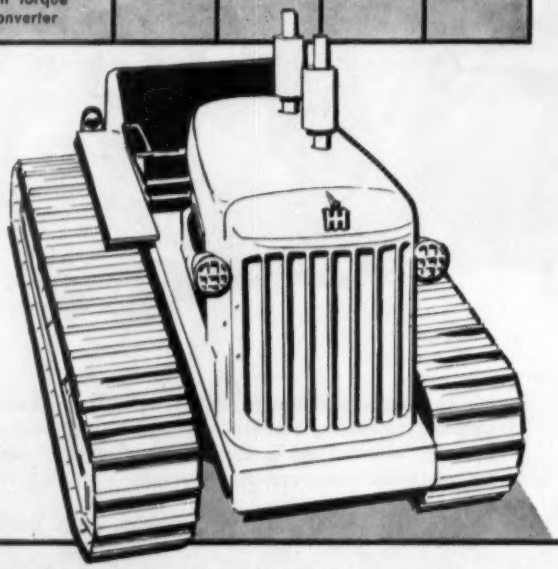
Maximum horsepower ratings alone are without meaning. Ratings must be studied across the speed range to measure your power dimension. Measure also the time and effort required for the operator to change his ratio of power application to push-pull effort or to speed effort. Check the smoothness with which power is applied, the waste in "bucking" a load. Also, the difficulties in shifting which may discourage an operator from using gear ratios to apply his power effectively.

Power at maximum "drawbar" is used little for tractive effort since, in low gear, tracks spin and power is wasted. Availability of maximum horsepower is important only in higher gears where it can be used with no slippage. *All* tractors are able to spin their tracks or wheels in low gear on normal footing . . . therefore horsepower should be considered as a power source available for use in *any direction* . . . should not be related to tractive effort alone. The most effective power combination lets the operator work at the highest practical speeds which job conditions permit.

CAT D8 191 hp with torque converter	MPH (Approx.)			
	1.5	2.0	2.5	3.0
	Pounds of pulling effort			
	30,000	24,000	18,000	15,000



IH TD24 200 hp with torque converter	MPH (Approx.)			
	1.5	2.0	2.5	3.0
	Pounds of pulling effort			
	32,500	22,500	18,000	15,000



Figures taken from manufacturers' specification sheets available to us at time of printing.

Usable pounds-pull results from many factors: type of material, conditions underfoot, weight of tractor, and forward speed, all combined have a definite effect on the pounds of drawbar pull.

From the charts, you can see that Tournatractor compares favorably with track-type tractors at today's commonly used speeds. When job conditions are adverse, use a crawler; in ordinary and favorable conditions you can put your job into high gear with rubber-

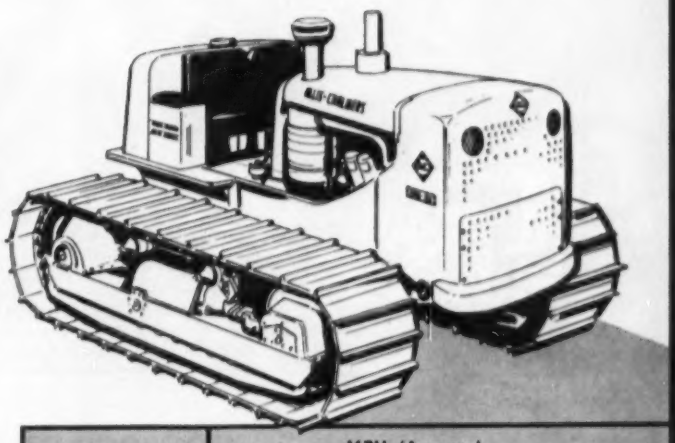
Dimension 2

TRACTION

Compare pounds pull...
but at your operating speeds...

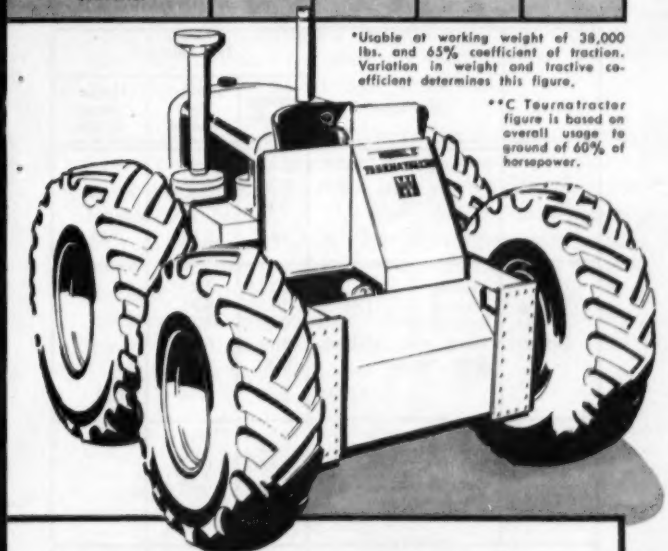
The materials you handle partially determine your choice of tractors. Track-type tractors conquer the most adverse conditions and offer tremendous traction and drawbar pull in ordinary footing. However, today's broad, deep-treaded, tapered-bead rubber tires equal track-type traction in many materials. Where traction becomes a major factor, the rubber-tired tractor can be given additional traction by increasing its weight. Extra weight is easily obtained with hydroflation of tires.

This flexibility of weight will pay off in providing a tractor that can utilize its speed to the fullest extent — yet add tractive effort when needed to do a wider range of heavy-duty tractor work.



LeT-WEST C** 208 hp with torque converter	MPH (Approx.)			
	1.5	2.0	2.5	3.0
	Pounds of pulling effort			
	24,700*	23,500	18,800	15,650

AC HD21 204 hp with torque converter	MPH (Approx.)			
	1.5	2.0	2.5	3.0
	Pounds of pulling effort			
	Pounds-pull curve not shown in manufacturers' literature available to us.			



*Usable at working weight of 38,000 lbs. and 65% coefficient of traction. Variation in weight and tractive coefficient determines this figure.

**C Tournatractor figure is based on overall usage to ground of 60% of horsepower.

Comparable traction of tires to tracks, in some materials, is made possible by a wide choice of tire treads. A smooth-type tire, for example, works better than tracks in sand, because it doesn't dig in. Deep lateral cross-bars are designed for rock — the tire deflects over sharp rock and the deep tread prevents damage to the carcass. Diagonal bars give maximum bite in loose materials. Tournatractor tires — 2¼ feet wide, 5¾ feet high — are of double strength nylon cord and tough rubber. Inflated with only 20 pounds pressure, the tires flex over rough ground. Continual flexing of sidewall keeps the tread areas clean for a positive bite on each tire revolution.

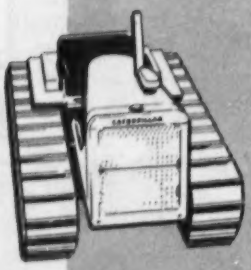
Crawler tracks — long and wide — have shoes of steel with deep-biting grousers. At higher speeds, much of the engine output goes to power the tracks themselves. Much of the tracks' efficiency can be lost in gummy materials, since area between grousers fills in and tracks become smooth, flat belts. Accumulated mud and dirt on tracks and rollers also reduces theoretical power applied to pulling effort.

tired Tournatractor. Consider, too, how often you use all the traction available in track-type tractors. Ordinary dozing and push-loading are done in second and sometimes third gear, at speeds, ranging up to 2 miles per hour. High-speed dozing or loading with Tournatractor may require a thinner cut, but the excavated area is kept smooth, allowing faster travel of dozer and quicker entry and exit of scrapers. Too, it permits quicker return to work after wet weather.

before you buy, check all four dimensions . . . see next page

Dimension 3 SPEED

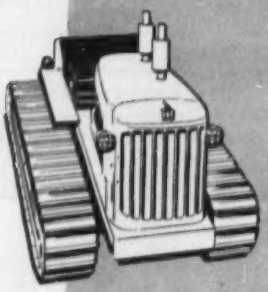
Compare speeds, and what they mean to profit...



CAT - D8

SPEEDS IN MPH

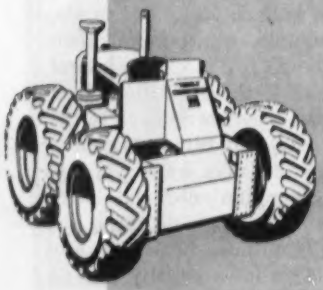
FORWARD	REVERSE
0 to 3.6 Low	0 to 3.6 Low
0 to 7.4 High	0 to 7.4 High



IH - TD24

SPEEDS IN MPH

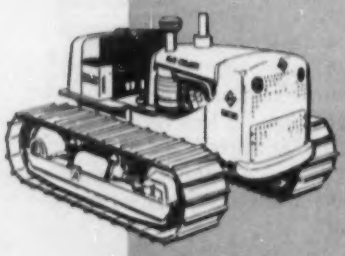
FORWARD	REVERSE
0 to 7.6	0 to 6.6



LeT-WEST C

SPEEDS IN MPH

FORWARD	REVERSE
0 to 17.4	0 to 7.3



AC - HD21

SPEEDS IN MPH

FORWARD	REVERSE
0 to 3.0 Low	0 to 5.5
0 to 7.5 High	

All above tractors equipped with torque converter. Figures taken from manufacturers' specification sheets available to us at time of printing.

Few heavy-duty tractors have kept pace with today's trend to high speed. Hauling units, scraper-combinations, loaders, shovels, cranes, and other types of earth-moving equipment are now available on rubber for greater speed; yet most of the big tractors still roll on speed-limiting steel tracks. Habit, plus the large number of crawler-tractors still in use, make it easy to overlook the possibilities of profit and time advantage available through use of the speed dimension. For instance, on an ordinary dozing cycle, if speed can cut your back-up time in half, you can increase the number of cycles per hour on this saving alone by 15%! Since costs remain constant, this increase in production is almost entirely profit. There is another point on speed that may be of interest. As crawler speeds are increased, and as the high gear-ranges are more extensively used, you add materially to the track-wear and expense.

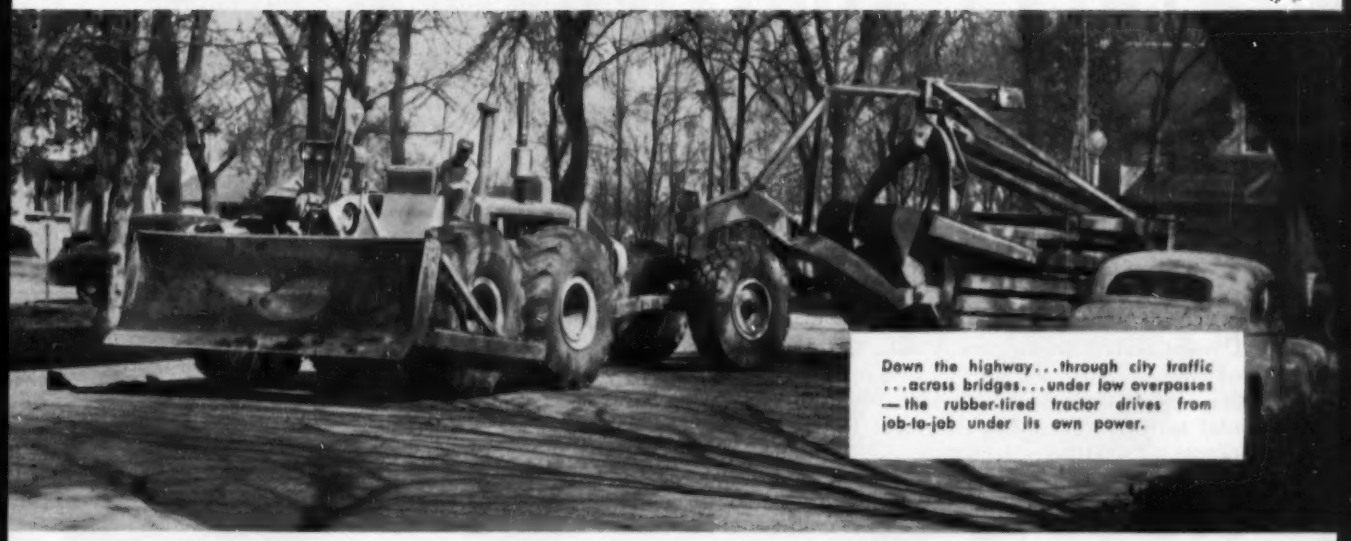
The farther the travel distance, the more closely you should look into the advantages of rubber in the third dimension — *speed* — to increase your profits.

Work	Operation	Time (minutes)		
		Average Crawler	Rubber-Tired Tractor	Speed Saved in Min.
Dozing	Pushing load ..150 ft.	0.86	0.57	
	Return .....150 ft.	0.36	0.21	
	Gear changes	0.30	0.10	
	TOTAL	1.52	0.88	0.64
Pulling 15-yd. Scraper	Loading	0.75	1.25	
	Hauling .....1000 ft.	2.10	0.76	
	Spreading	0.40	0.40	
	Return .....1000 ft.	2.10	0.63	
	Gear changes	0.30	0.10	
	TOTAL	5.65	3.14	2.51
Push-loading	Loading	0.85	1.10	
	Return	0.42	0.21	
	Gear changes	0.30	0.10	
	TOTAL	1.57	1.41	0.16
Pulling 20,000# Roller	600-ft. cycle travel..	3.40	2.72	
	turns	0.30	0.30	
	TOTAL	3.70	3.02	0.68

Figures computed from manufacturers' specification sheets available to us at time of printing.

RESULT: With these minutes saved, you can doze more, haul more, compact more . . . add extra profit with no extra cost.

Dimension 4 MOBILITY



Down the highway...through city traffic ...across bridges...under low overpasses — the rubber-tired tractor drives from job-to-job under its own power.

Here's what mobility can mean to you

As your business grows bigger, each step involves taking jobs farther and farther apart . . working on wider and longer right-of-ways . . . with bigger yardage that breaks into longer work-sections. Also as jobs become more complicated, and equipment more specialized, you find need for more moving around on the job to apply the best tool to each assignment.

So the need for mobility is increasing each year, while, at the same time, the cost of moving track-type equipment designed to slug-it-out in a limited area becomes higher and higher. A truck and trailer must be employed for each move of each piece of crawler equipment. It usually requires two men to load and unload the equipment from the low-boy. Over the years, your tractors have become bigger and heavier; it takes bigger and heavier trucks and trailers to haul them. Also it takes more time and costs more money.

Only a rubber-tired tractor can readily move job-to-job over highways under its own power and thus give you a bonus on each move it makes. Special routes are unnecessary — the rig on rubber rolls over city streets, across bridges, under low overpasses, at speeds to 17 mph. Also your rubber-tired tractor can frequently take time-saving short cuts that would be impossible for truck-and-trailer haul.

Rubber-tired units can save money on-the-job by handling scattered assignments and traveling between them in a matter of minutes. It can also fill in slack periods on your major construction projects with profitable outside rental or contract work.

In today's earthmoving, mobility must be considered an important dimension in tractor selection — it can boost your profits on any job!

Contractors need mobility to move fast from one contract to the next, from one assignment to the next...push-loading, dozing, towing compactors and compressors, backfilling, servicing detours, building access roads, and clean-up.

Mines and Quarries need mobility to shuttle between removal of overburden...leveling dump areas...stockpiling materials...maintaining haul roads...clean-up around shovels...towing drills and compressors...cleaning waste from benches.

States and Municipalities need mobility to daylight curves...fill washouts...backfill culverts and bridges...open up gravel deposits...remove old blacktop...reshape road shoulders...clean ditches...remove snow.

before you buy, check all four dimensions . . . see next page

To back up the speed dimension...

instant GEAR SHIFTING

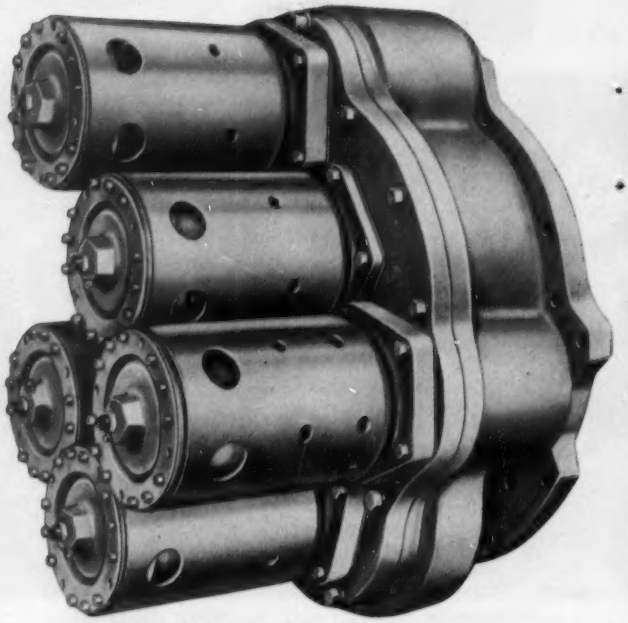
moves more yardage in less time

Five seconds is all the time it takes to read this short sentence. Yet, if you could save just five seconds *every* time your tractor operators change gears, consider your total saving. You probably average two shifts every minute on a dozing operation . . . 100 in a 50-minute work-hour . . . or 1,000 in a ten-hour work-shift! A five-second saving on *each* of these gear changes adds up to eight minutes in an hour, or 80 minutes saved during a 10-hour day.

That can mean 60 or more extra loads handled each day because of a five-second saving in changing gears! So you see the method of gear changing is very important to get the most out of your speed dimension.

Most modern tractors available for use in earthmoving have constant-mesh transmissions. Gears are constantly in mesh, but clutch must be manually disengaged, with double-clutching sometimes necessary to move the sliding collars and change the gear combinations and ratios. Shifts take from four to eight seconds.

Only one machine...Tournatractor...has a constant-mesh transmission operated by instantly operating air-actuated clutches. Each gear arrangement has its own clutch. A simple, effortless movement of a gear selector lever instantly changes gear ratios in *less* than a second without a pause . . *air does the work.* Reverse speeds are attained just as quickly and smoothly. The non-stop shifting of Tournatractor can save you an average of 5 seconds on each change of gears, gives you more continuous production, more yardage moved every work-hour, makes any operator a *fast* operator.

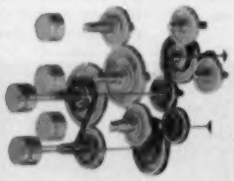


Tournatractor Transmission...No stops for shifting, no lost momentum — infinite gear-ratios automatically selected.

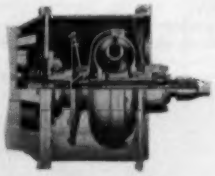
5 x 2 = 10
10 x 50 = 500 sec.
8 min.
60) 500
10 x 8 = 80 min.
80 min. saved
every day!
with Tournatractor

Speed Selector . . . Operator transfers power instantly from one gear-ratio to another—forward or reverse—with an easy movement of this simple speed-selector. Response is instantaneous.

Transmission Clutch... multiple-disc, 7" clutch applies 290 square inches of grip to each gear-shaft. Engages and releases, under air-pressure, in combinations that give instant speed-selection. Clutches easily adjusted.



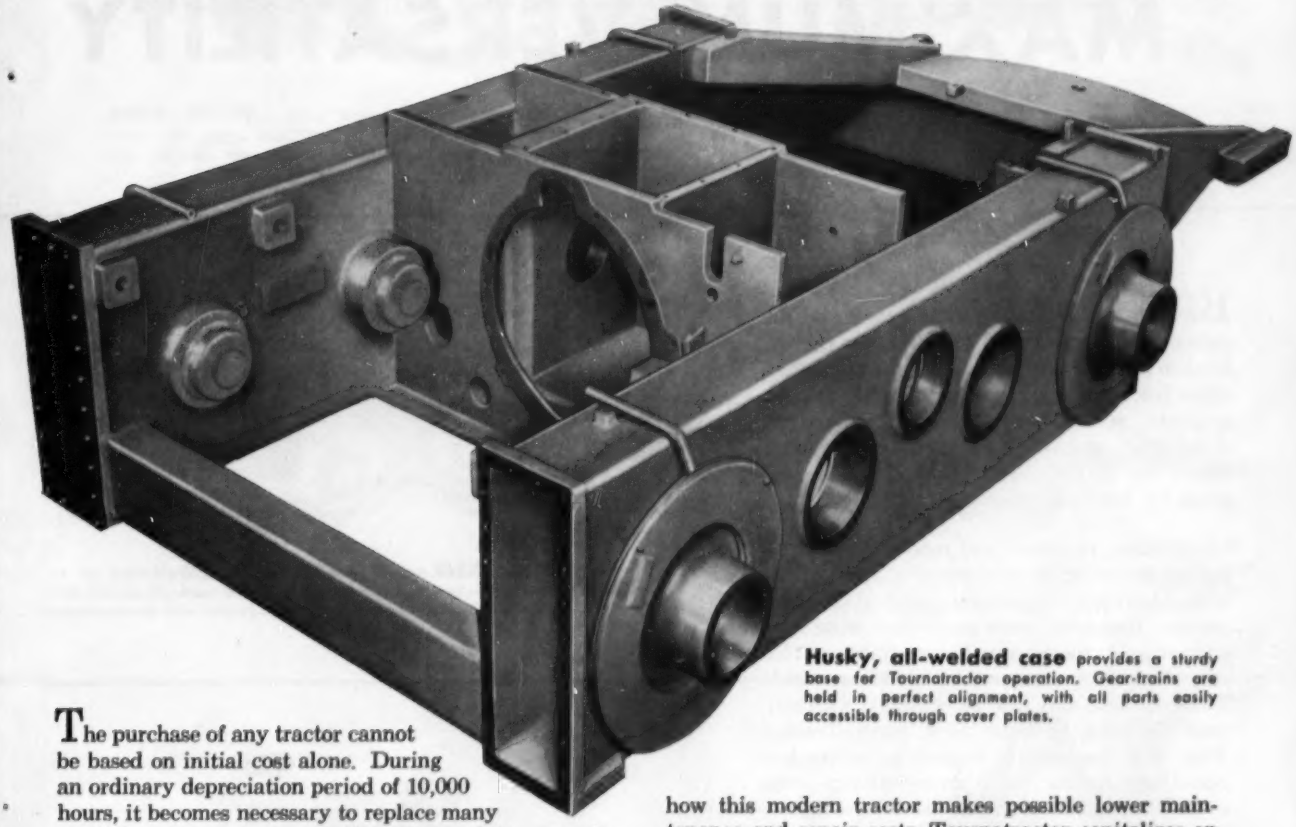
Gear-Trains . . . heavy-duty, precision-cut gears mesh smoothly. Special heat-treating produces a wear-resistant surface. Constant oil-bath further reduces wear. Shafts ride on anti-friction bearings.



Torque Converter...a simple, trouble-free, low-pressure unit with single impeller, reactor, and turbine. Eliminates shock-loads, provides unlimited speed-ranges, automatically increases engine-torque to match load.

To back up all dimensions...

check OPERATING COSTS



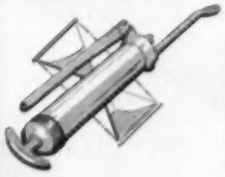
Husky, all-welded case provides a sturdy base for Tournatractor operation. Gear-trains are held in perfect alignment, with all parts easily accessible through cover plates.

The purchase of any tractor cannot be based on initial cost alone. During an ordinary depreciation period of 10,000 hours, it becomes necessary to replace many working parts and to rebuild others. The owner's "out-of-pocket" cost for maintenance time, supplies, repair parts, and labor alone is important. Even more important is the number of hours the tractor is deadlined and not producing. To get the true picture of operating cost, you should consider these combined figures as your cost-per-hour of operation which you must subtract from the production earnings of the machine.

In the crawler group these costs are pretty well standardized, but we think you should take a special look at the design and construction of Tournatractor to see how this modern tractor makes possible lower maintenance and repair costs. Tournatractor capitalizes on integrated design. The heavy-duty main-case is fabricated of tough steel, stress relieved, and line-bored to assure precision shaft and bearing alignment. There are no independent oscillating assemblies that can become sprung out of line and cause increased wear on its components. In Tournatractor, all moving parts work against surfaces, always in line, assuring long tractor-life with minimum maintenance. A few of the other basic Tournatractor economies are illustrated in the panels below. Have your master mechanic check a modern Tournatractor to get the complete story.

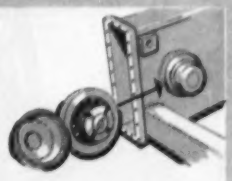
Anti-friction bearings are used throughout Tournatractor to reduce horsepower drag and costly wear to a minimum.

Heat-treated gears, through exclusive process, have hard, wear-resistant surfaces. Cores and roots retain their shock-resistant qualities.



Grouped Lubrication through fewer fittings, oil enclosures, and far fewer moving parts, combine to save operator about 5 min. work-time each shift.

4 tires vs over 500 track parts . . . four tough tires eliminate exposed wearing parts such as track rollers, bushings, pins, shoes, and seals.



Sealed protection keeps abrasive dust, mud, water, and other elements sealed out . . . lubricants sealed in. Saves lubricants, saves time, saves wear.

before you buy, check all four dimensions . . . see next page

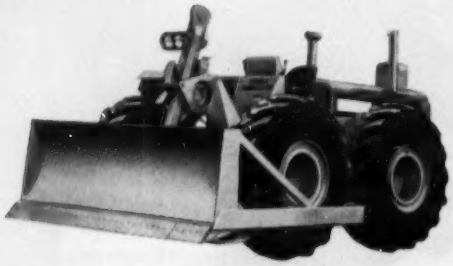
For dimensions of the future... look for

MAXIMUM VERSATILITY

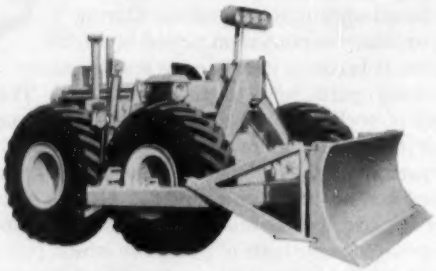
Because of exceptional advantages in the dimensions of speed and mobility, the rubber-tired tractor offers far more versatility than other tractor-types. By applying it to the job properly, it can successfully pioneer, doze, clear, level, and load scrapers in the "power" zone...or it can haul equipment and pull loads in the "high-speed" zone.

In addition, its speed and mobility gives it a big advantage in its wide range of applications with bulldozer, angledozer, push-plate, tree-pusher, root-rake, snow-plow and wing...or with scraper, rooter, scarifier, compaction rollers, sheepsfoot, tampers, or skidding winch. Tournatractor may also be equipped with railroad coupling to serve as a SwitchTractor. This wide versatility, backed by a modern speed-type tractor, offers an exceptional range of profit opportunities for the future. Its exceptional mobility and versatility lengthens the work season—and provides insurance of job opportunities under any changes in the economy.

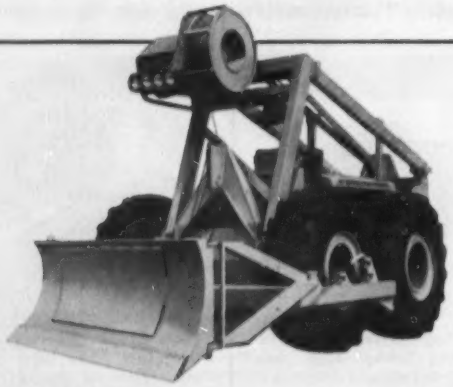
Don't restrict your choice of a tractor to one that is tied by limitation in its dimensions to just a few applications . . . look your future over carefully to see if you can gain extra profit with multi-purpose, *four-dimension* versatility . . . available in Tournatractor.



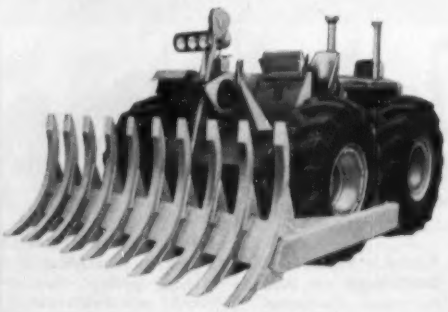
BULLDOZER — blade design reduces power required for pushing — live load rolls ahead with less work effort and minimum power loss. High-speed electric control with down-pressure.



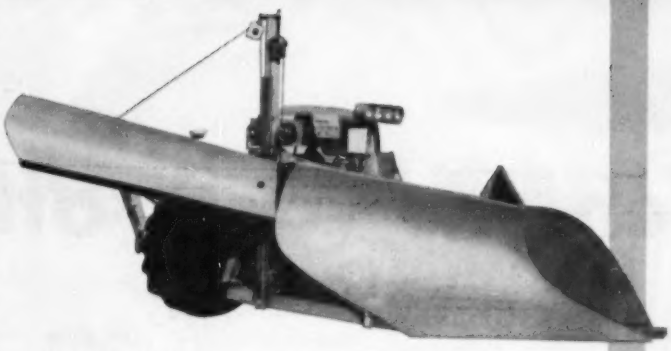
ANGLEDOZER — four-way adjustment permits blade to be tilted up and down on either corner . . . forward or back on either side. Excellent for side-hill work.



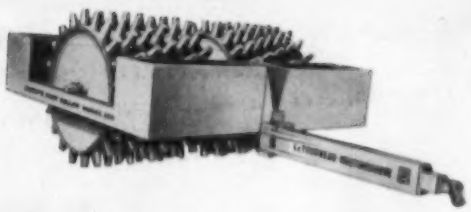
WINCH — tremendous line pull — to 80,000 pounds — snakes in logs, poles, pipe, and other materials. Powerful winch is top-mounted for a wide work-range. Has quick release clutch.



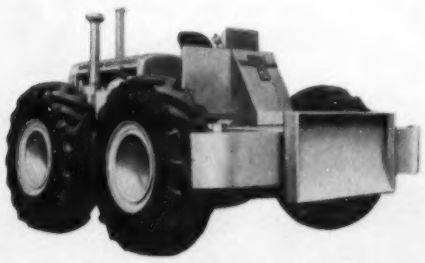
ROOT-RAKE — husky, alloy-steel teeth "comb" the ground, ripping out roots, rocks, and debris, leaving the earth in place. Carries load to spoil pile, sheds readily.



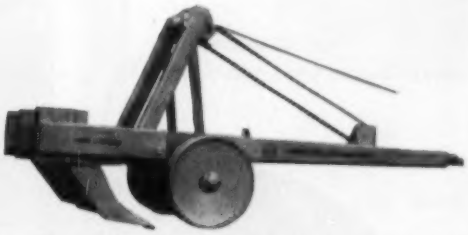
SNOW-PLOW — speed and power "busts" drifts, throws snow wide, opens roads fast. Tires cannot damage road surfacing. Optional wing extends spread on roadside banks.



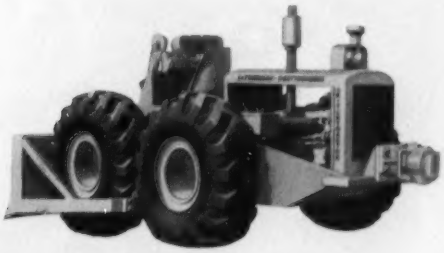
SHEEPSFOOT ROLLERS — Tournatractor's big tires help complete specified compaction in fewer passes. This roller can be teamed in two and four-drum units. Other types available.



PUSH-BLOCK — heavy-duty bumper and plate concentrates tractor power on push-point. Easy contact . . . makes maximum use of Tournatractor power and traction.

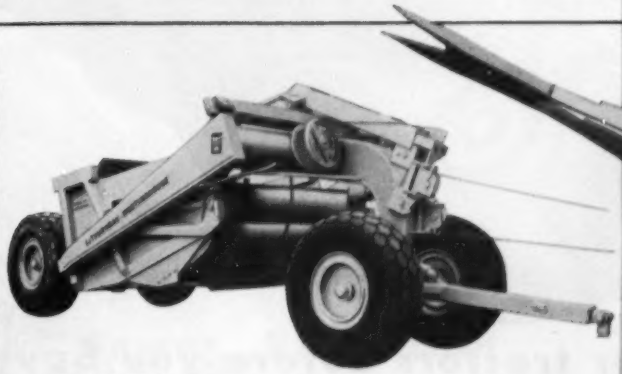


ROOTERS — Tournatractor pulls rooters with up to 40 thousand pounds lift at teeth to handle toughest jobs. Will rip layered rock, asphalt, concrete, and hardpan for faster loading.



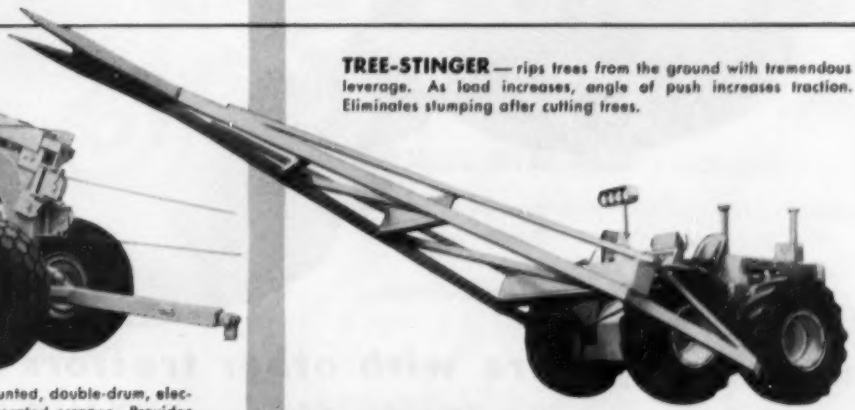
SWITCH TRACTOR — standard railroad car-coupling provides switcher and tractor combination that goes anywhere, on or off roadbed. Tires straddle rails, do not damage ties.

SIDE-BOOM — heavy-duty crane has vertical lifting capacity of 28,000 pounds. On Tournatractor, it provides high-speed travel for scattered pipelaying and loading operations.



SCRAPERS — Tournatractor's rear-mounted, double-drum, electric power-control operates any cable-operated scraper. Provides extra speed and mobility for tractor-hauled dirt.

TREE-STINGER — rips trees from the ground with tremendous leverage. As load increases, angle of push increases traction. Eliminates stumping after cutting trees.



before you buy, check all four dimensions . . . see next page

For 4 dimensions on rubber

check facts on

Compare with other tractors before you buy on basis of your present-day needs for

the C TOURNATRACTOR

ENGINE:

GM 6-71; 6-cylinder; 2 cycle;
Max. brake HP 208 @ 2000 RPM.

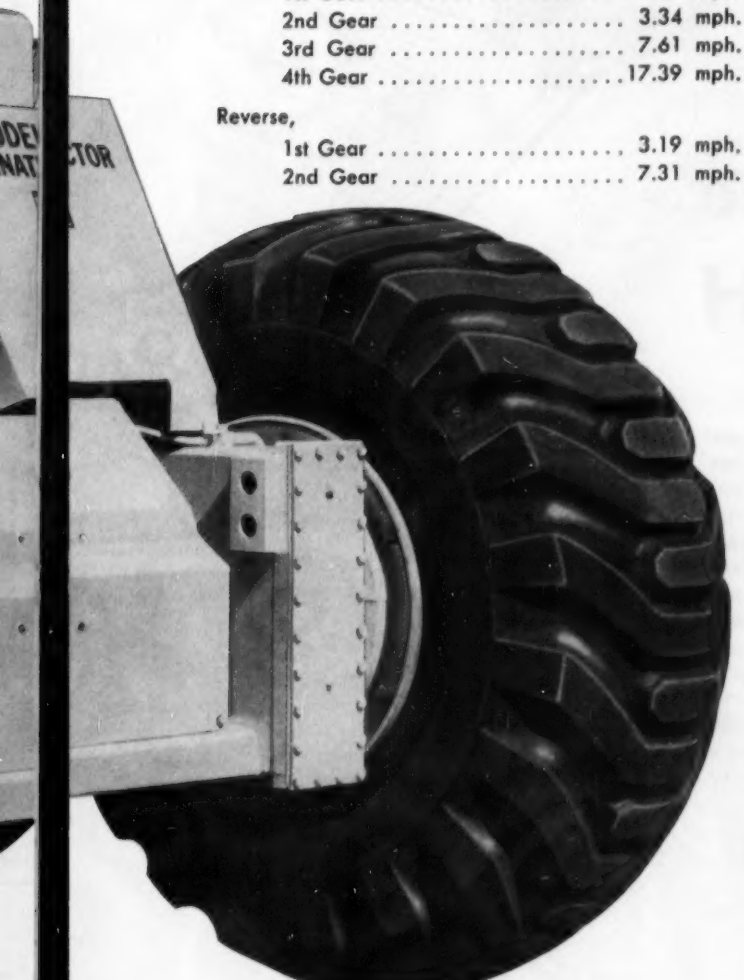
SPEED:

Forward,

1st Gear	1.46 mph.
2nd Gear	3.34 mph.
3rd Gear	7.61 mph.
4th Gear	17.39 mph.

Reverse,

1st Gear	3.19 mph.
2nd Gear	7.31 mph.



TRANSMISSION:

Constant-mesh, multiple-disc clutches, air-actuated.

POWER-CONTROL UNIT:

Individual Tournatorque Electric Motors
with Gear-Box at point-of-action.

STEERING:

Two wheels, each side, controlled by
air-actuated, multiple-disc clutches and brakes.

BRAKES:

Multiple-disc, air-actuated, 700 sq. ins.
of braking surface on each wheel.

TIRES:

4 — 21 x 25 — 16 ply or
4 — 26.5 x 25 — 14 ply (wide base)

DIMENSIONS:

Length	17′ 0″
Width	10′ 1″
Height	8′ 10″
Gauge	8′ 4½″
Wheelbase	6′ 0″
Ground Clearance	13½″

CAPACITIES:

Radiator	12 gal.
Engine Crankcase (including filters)	6 gal.
Transmission	14 gal.
Final Drive (2)	17 gal.
Fuel Tank	80 gal.
Torque Converter	13 gal.

APPROX. SHIPPING WEIGHT:

28,000 lbs. (bare Tractor and without hydroflation)

ACCESSORIES AVAILABLE (optional):

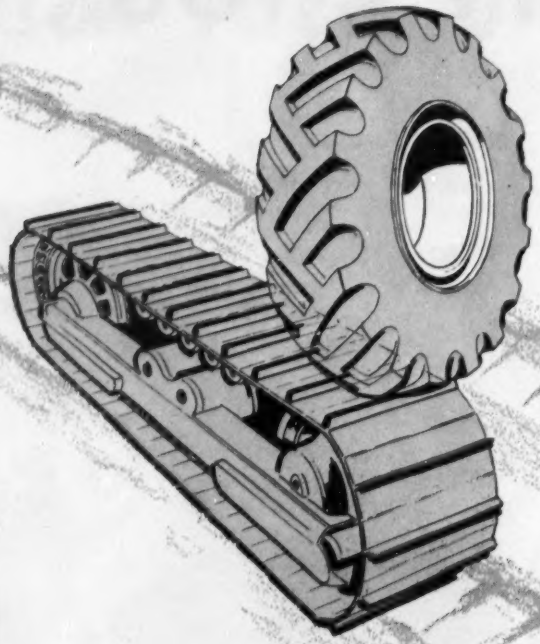
Cab; Cab Heater and Defroster; Windshield Wiper;
Horns; Swinging Drawbar; Double Parking Brake.

Specifications subject to change without notice.

1. Power 2. Traction
3. Speed 4. Mobility

before you buy, check all four dimensions . . . see next page

To meet your dimension requirements...

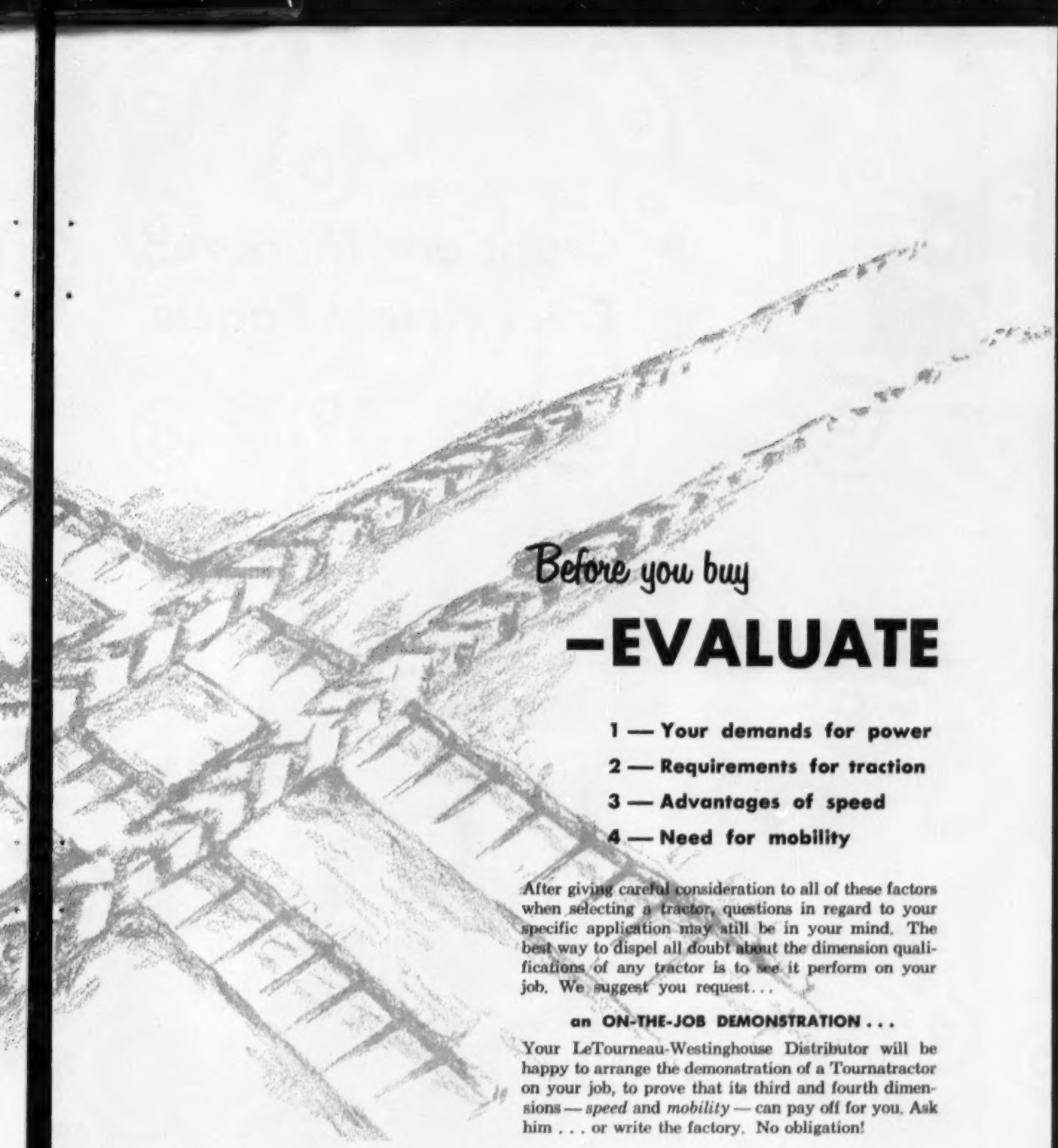


There's a place for BOTH

Work problems today demand modern equipment that can do specific jobs faster and at lower cost. Tournatractor is a modern tractor designed to take advantage of all the four dimensions . . . *power, traction, speed* and *mobility*. It does not offer as much drawbar horsepower at speeds below 2 miles per hour as do track-type tractors of equal engine horsepower. But, if your job conditions are such that you can capitalize on the third and fourth dimensions — *speed* and *mobility* — with a machine that delivers comparable traction at present day speeds, we suggest you consider the *new* LeTourneau-Westinghouse Tournatractor. The cost is 10% below that of track-type tractors with torque converters and comparable engine horsepower.

LET W

Reprints of this 14-page advertisement on the four dimensions of earthmoving will be furnished on request.



Before you buy

—EVALUATE

1 — Your demands for power

2 — Requirements for traction

3 — Advantages of speed

4 — Need for mobility

After giving careful consideration to all of these factors when selecting a tractor, questions in regard to your specific application may still be in your mind. The best way to dispel all doubt about the dimension qualifications of any tractor is to see it perform on your job. We suggest you request...

an ON-THE-JOB DEMONSTRATION . . .

Your LeTourneau-Westinghouse Distributor will be happy to arrange the demonstration of a Tournatractor on your job, to prove that its third and fourth dimensions — *speed* and *mobility* — can pay off for you. Ask him . . . or write the factory. No obligation!

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois, U.S.A.

A Subsidiary of Westinghouse Air Brake Company

Manufacturing Facilities at: Peoria, Illinois — Toccoa, Georgia — Indianapolis, Indiana — Paris, Ontario — Rydalmere, Australia — Campinas, Brazil.

Manufacturers of: Tournapulls®, Tournatractors®, Angledozers®, Flat-bed Haulers, Rear-Dumps, Bottom-Dumps, Snow-Plows, Cranes, Logging Equipment, Scrapers, SwitchMobile®®, SwitchTractor, Power Control Units, Rooters®, Rollers, Tournarope®, Adams Motor Graders, and TraveLoaders.

®®Trademark, ®Trademark Reg. U.S. Pat. Off. — CT-1077-G

In a delicate hoisting job...

Crane and Monorail Erect Heavy Panels

UNLOADING

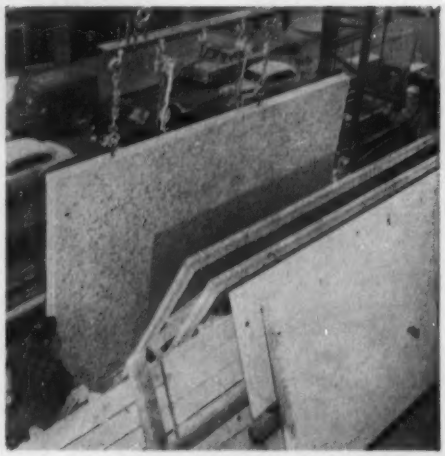
Chain hoists and comealong slung from Lorain Moto-Crane lift panel from truck. Steel angle is bolted in place in the casting yard.

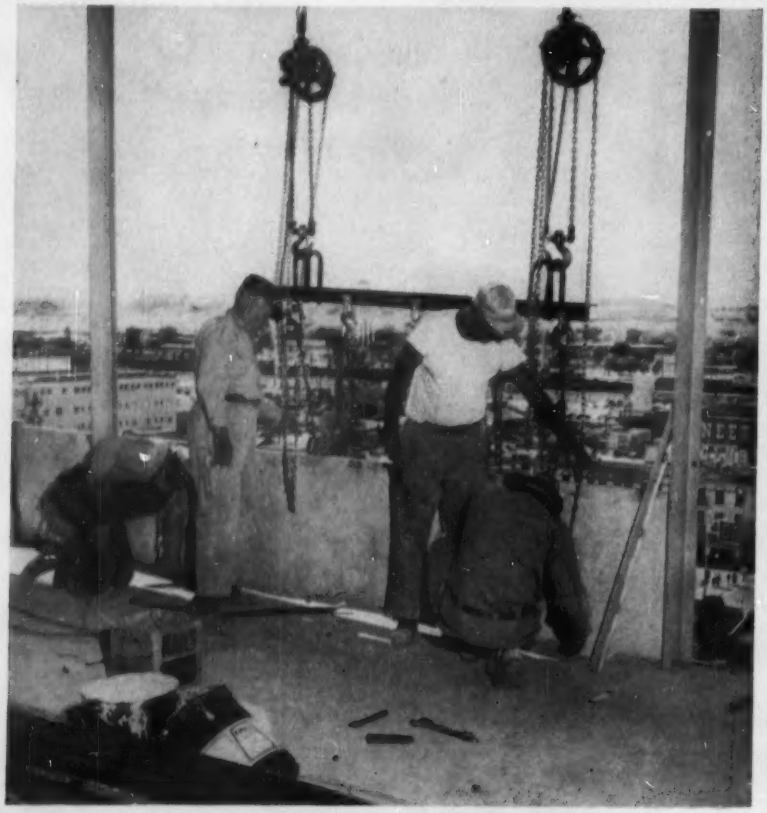
HOISTING

The steel channel used to unload the panel has been removed. Arrangement of crane slings and cable hooks also is different.

POSITIONING

Two 1½-ton Yale chain hoists, supported from a monorail on the roof, handle positioning. Hoist hooks are in outside brackets.





ERECTING 3,000-lb precast concrete panels for a 13-story hotel building in Las Vegas, Nev., required careful planning and positive handling both to prevent accidents and to protect the architectural finish of the panels. F. H. Morrell, superintendent of construction for Robert E. McKee, Inc., the contractor, worked out a lifting arrangement that did the job quickly and efficiently.

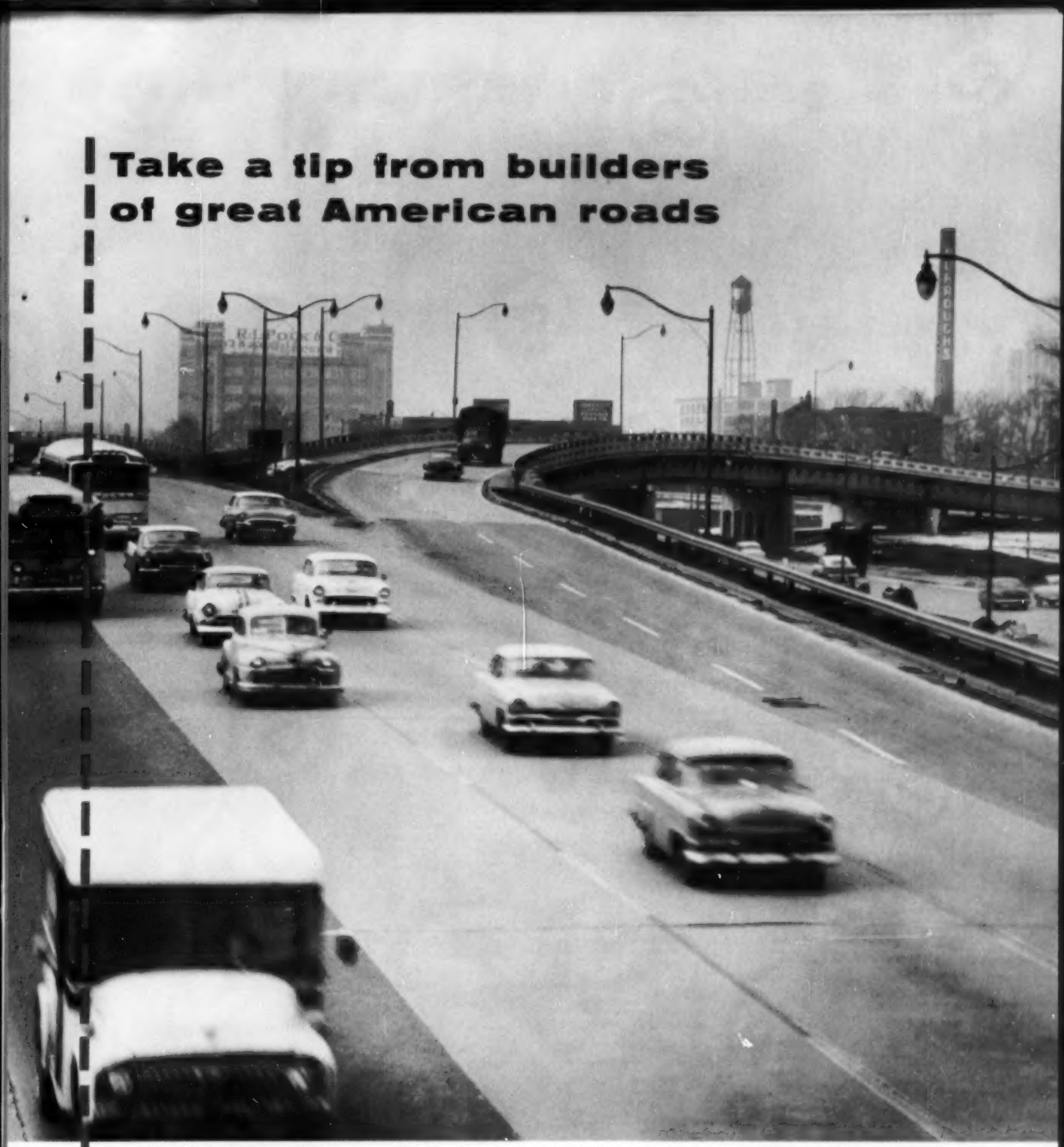
The panels were cast in Salt Lake City, about 450 mi from Las Vegas, and trucked to the site in loads of 15 panels each. To unload them from the truck, Morrell used a 30-ton Lorain Moto-Crane with a steel angle strongback and lifting bracket. Panels were held by two safety cables together with a pair of 1½-ton chain hoists and a comealong.

After lifting off the truck, the panels were hoisted to a vertical position and stored temporarily on an elevated platform that was part of the lower structure of the building. There the steel channel strongback, or lifting bracket, was removed.

To hoist the panels into position, Morrell used a slightly different lifting arrangement. The crane picked up the panel at the storage platform, but at final level, the load was transferred to two 1½-ton Yale chain hoists suspended from a monorail on the roof. This permitted moving the panels to places where the crane's boom could not reach. And it gave positive near-by control of the panel position.

The panels were fastened into place by bolting to steel columns and to inserts in the concrete floor slab. The 3⅝-in. thick units form most of the exterior wall. Architects for the Fremont Hotel—were Wayne McAllister and William C. Wagner of Los Angeles. Structural design was by John A. Martin, also of Los Angeles.

Take a tip from builders of great American roads



Edsel Ford Expressway, *important new traffic artery in Detroit, Michigan, is reinforced with American Welded Wire Fabric.*

Take a tip from the Pennsylvania Turnpike Commission. the Ohio Turnpike Commission, the Indiana State Highway Department, and others who are lacing America together with a network of outstandingly fine superhighways and thruways. Take a tip from them and use quality construction materials manufactured by American Steel & Wire to increase the life, the comfort, and the safety of your new roads.

Make your Portland Cement concrete slabs 30% stronger, at extremely low cost, with American Welded Wire Fabric. You will find it easy to handle . . . readily available in any size and style you need (greatly expanded manufacturing facilities assure this).

Use longer concrete slabs for smooth riding, to reduce installation costs and speed construction. Use American Road Joints to provide proper load transfer for a balanced pavement design.

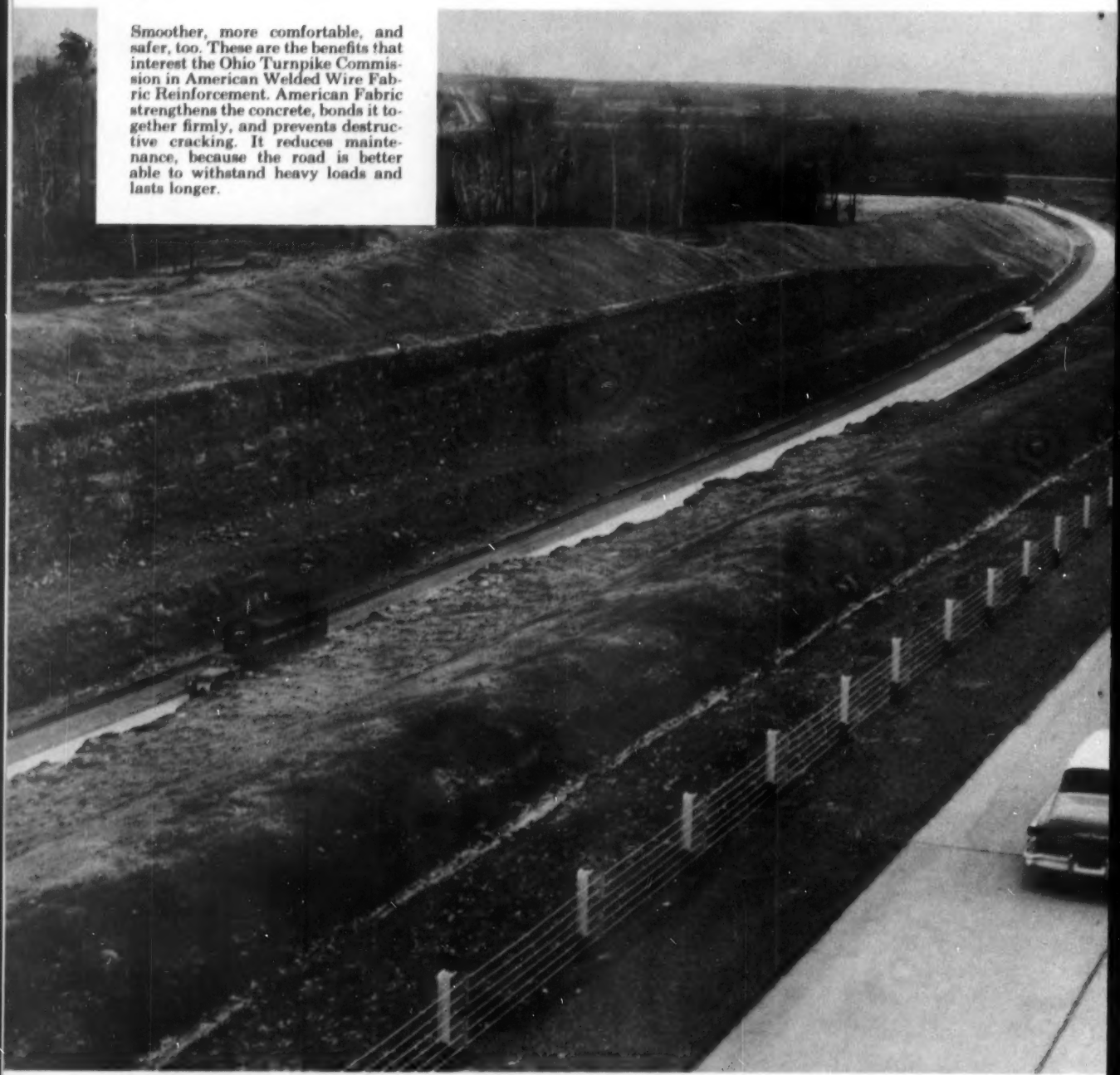
Help prevent off-road crashes with Multisafty Cable Highway Guard and American Beam-type Highway Guard.

You will find interesting new applications of these fine products on the next few pages. We think it will be worth your while to read on.

On a great "AMERICAN" road

...American Fabric and Road Joints reduce
...American Highway Guard reduces fatal

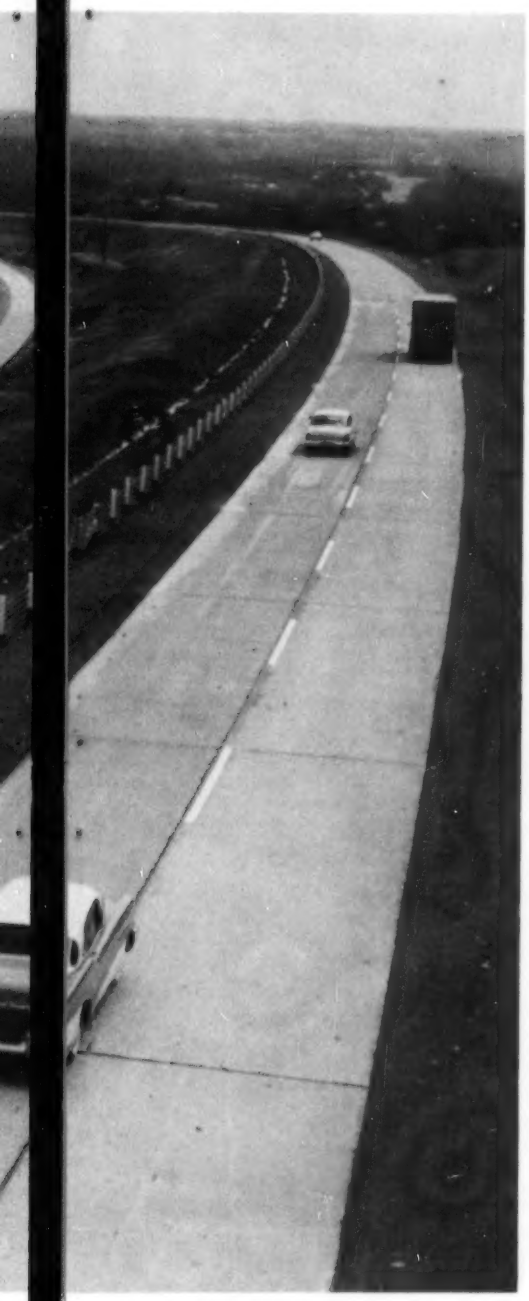
Smoother, more comfortable, and safer, too. These are the benefits that interest the Ohio Turnpike Commission in American Welded Wire Fabric Reinforcement. American Fabric strengthens the concrete, bonds it together firmly, and prevents destructive cracking. It reduces maintenance, because the road is better able to withstand heavy loads and lasts longer.

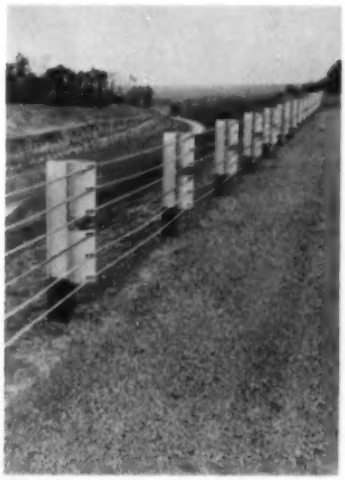


USS American Welded Wire Fabric

—THE OHIO TURNPIKE

maintenance accidents





Multisafty Cable Highway Guard makes this section of the famous Ohio Turnpike safer. The precipitous drop needed extraordinary protection. A special six-cable Multisafty Guard was designed to assure maximum protection. Elsewhere on the turnpike, four cables were used.

The longer reinforced slabs on the Ohio Turnpike provide a low cost, smooth-riding surface. And specially designed American Road Joints were used to keep the slabs in proper alignment and to provide adequate load transfer for a balanced pavement design.

Expanded facilities for the manufacture of American Welded Wire Fabric now make it readily available in wire sizes up to and including ½" in diameter, at 2", 3", 4", and 6" on center. American Fabric increases the life of both Portland Cement Concrete and asphaltic concrete pavements. It meets ASTM Specification A 185-53T.

When it comes to safety, remember that USS Multisafty Cable Highway Guard protects in two ways: it restrains uncontrolled vehicles and it cushions the impact of collision between vehicle and guard.

Send this coupon for complete facts about American Steel & Wire products that can increase the safety and help reduce the long-term cost of your roads.

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- ☐ American Welded Wire Fabric for Airport Runways
- ☐ American Road Joints
- ☐ Multisafty Highway Cable Guard
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UNITED STATES STEEL

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Maine Turnpike protected with American Highway Guard

On this particular section of the Maine Turnpike, highway engineers preferred a beam-type guard and American Steel & Wire supplied it. On other sections of this important northeastern road, USS Multisafty Cable Highway Guard is being used.

Indiana Toll Road strengthened with American Road Joints

Scheduled for completion late this year, the new Indiana Turnpike is another important link in a growing network of East-West superhighways. American Welded Wire Fabric, together with adequately reinforced joints, provides maximum corner protection for this concrete pavement.

For complete information about Construction materials manufactured by American Steel & Wire, send the coupon on the previous page.

USS American Welded Wire Fabric
USS Multisafty Highway Guard

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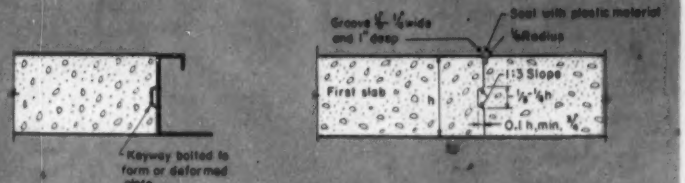
FIG. 1

LONGITUDINAL CONSTRUCTION JOINTS

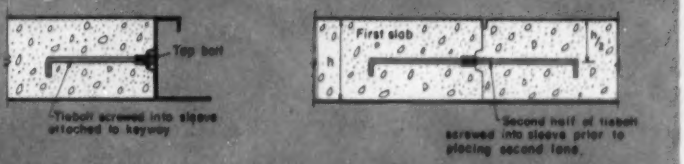


UNTIED KEYED JOINT

One half of tiebar bent away from observer along form
First slab
h
h/2
Tiba end bent to form support
Tiba end straightened after removal of form before placing second lane

All details and dimensions the same as untied joint above.

KEYED JOINT WITH TIEBAR


Top bolt
First slab
h
h/2
Tiebolt screwed into sleeve attached to keyway
Second half of tiebolt screwed into sleeve prior to placing second lane.

All details and dimensions the same as untied joint above.

KEYED JOINT WITH TIEBOLT

9. Jointing and Curing of Concrete Paving

By LEO M. ARMS, Manager, Highways & Municipal Bureau, Portland Cement Association

NO PHASE of concrete pavement design and construction procedure has undergone as much change in the last few years as has that pertaining to joints. The outstanding development has been the trend toward the use of sawed joints. There have been other developments in the construction of joints; but none have obtained the widespread acceptance that has been accorded to sawing.

With the exception of construction joints, whose purpose is self-evident, joints are placed in concrete pavement to reduce stresses caused by changes in volume of the concrete. Longitudinal and transverse joints at proper intervals keep these stresses within safe limits and control the formation of irregular cracks.

Longitudinal Joints

Longitudinal joints may be construction joints located along the edges of slabs placed one lane at a time, or joints along the centerline of lanes which are more than 12½ ft wide and less than 12 in. thick.

Longitudinal construction joints against which additional lanes will be placed should be of the tongue and groove type. Depending upon design requirements, these may or may not be provided with tiebars or other devices to join the two slabs together.

The joint groove is formed by fastening a keyway on the inside of the form for the first slab placed. Fig. 1 shows recommended keyway dimensions and methods of installing tiebars or tiebolts. The keyway preferably is of metal: this type facilitates the installation of tiebars or tiebolts when they are required. If wooden keyway strips are used, they are oiled before each use to prevent swelling due to absorption of water from the concrete.

The edges of the concrete along the keyway forms should be rounded to a radius of ⅛ in. When using the edging tool, care must be taken to keep the vertical leg perpendicular. This prevents cutting a ledge at the bottom of the vertical leg. A small groove as shown in Fig. 1 is placed in the edge of the second slab at the surface to permit sealing of the joint. This surface groove also prevents spalling, which may develop if a narrow ledge is left on the side of the first slab by the edger.

Longitudinal center joints may be of the surface-groove type, such as a sawed cleft, dummy groove, or ribbon. They also may be formed by using a deformed metal plate. Fig 2 shows these various types. The depth of the joint should be about one-fourth the slab thickness.

(Continued on next page)

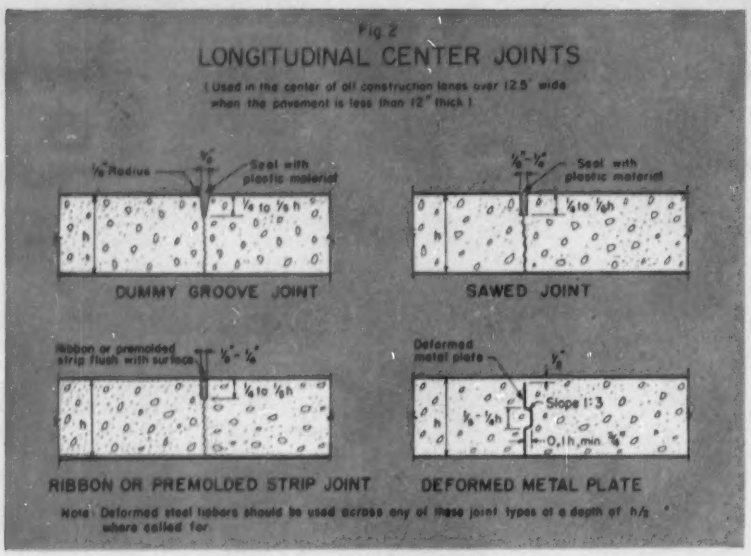


Fig 2
LONGITUDINAL CENTER JOINTS
(Used in the center of all construction lanes over 12.5' wide when the pavement is less than 12" thick)
⅛" Radius
Seal with plastic material
¼ to ⅓ h
DUMMY GROOVE JOINT
⅛"-¼"
Seal with plastic material
¼ to ⅓h
SAWED JOINT
Ribbon or premolded strip flush with surface
⅛" - ¼"
¼ to ⅓h
RIBBON OR PREMOLDED STRIP JOINT
Deformed metal plate
⅛"
Slope 1:3
⅛" - ⅛h
0.1h min ¾"
DEFORMED METAL PLATE
Note: Deformed steel tiebars should be used across any of these joint types at a depth of h/2 where called for

Sawing joints in concrete pavement, as previously mentioned, is gaining in popularity. Equipment, blades and sawing procedure have undergone extensive improvement in the few years since this method was introduced.

The first saws were manually pushed, single-blade machines on solid rubber tires. However, self-propelled machines with more powerful motors are gaining favor. The more uniform travel of self-propelled saws, and the sustained high speed made possible by increased power, result in increased footage per blade. Multiblade machines also have been developed and used on some projects.

Several types of blades are available, each having its most suitable application. Saw blades have been developed for various hardnesses of concrete and speed of operation. Selection of the proper blade for a particular condition is essential for economical life where hard aggregates are used. An ample supply of water under pressure for cooling and lubrication also is essential.

The first blades were of steel with diamond cutting edges. The diamonds project about ⅛ in. around the edge of the wheel, and when they are worn off, the blade is discarded. Sawing concrete too soon after placing with this type blade causes excessive wear because of increased abrasion from loose sand particles. Therefore, the sawing is usually done as *late* as possible, but before cracks develop.

Abrasive blades have been developed which are made of silicon carbide or other abrasive, reinforced with mesh. These blades cut a wider groove than diamond blades. They are used to saw concrete containing softer aggregates, such as limestone, slag or coral. Abrasive blades are usually 14 in. in diameter and can be used until

(Continued on page 123)

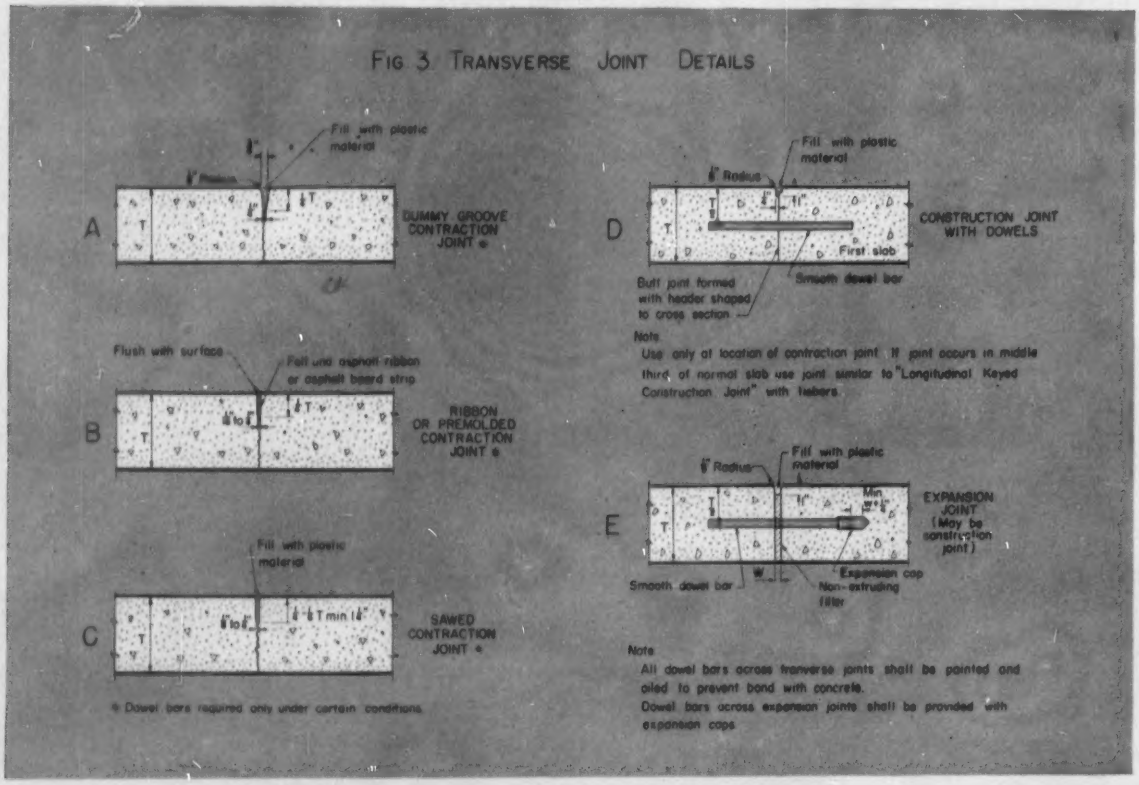


FIG 3 TRANSVERSE JOINT DETAILS
A
Fill with plastic material
DUMMY GROOVE CONTRACTION JOINT *
B
Flush with surface
Felt and asphalt ribbon or asphalt board strip
RIBBON OR PREMOLDED CONTRACTION JOINT *
C
Fill with plastic material
SAWED CONTRACTION JOINT *
* Dowel bars required only under certain conditions
D
Fill with plastic material
Radius
First slab
Smooth dowel bar
Butt joint formed with header shaped to cross section
CONSTRUCTION JOINT WITH DOWELS
Note
Use only at location of contraction joint. If joint occurs in middle third of normal slab use joint similar to "Longitudinal Keyed Construction Joint" with tiebars.
E
Radius
Fill with plastic material
Smooth dowel bar
Expansion cap
Non-extruding filler
EXPANSION JOINT (May be construction joint)
Note
All dowel bars across transverse joints shall be painted and oiled to prevent bond with concrete.
Dowel bars across expansion joints shall be provided with expansion caps

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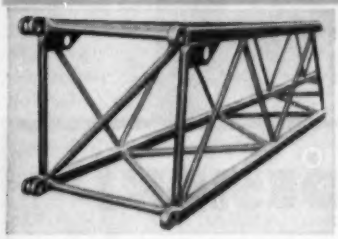

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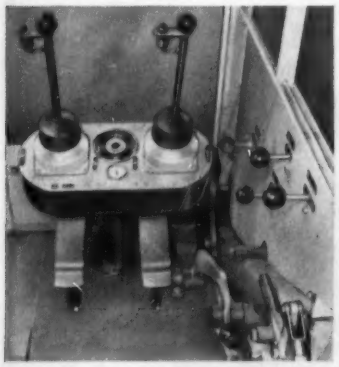

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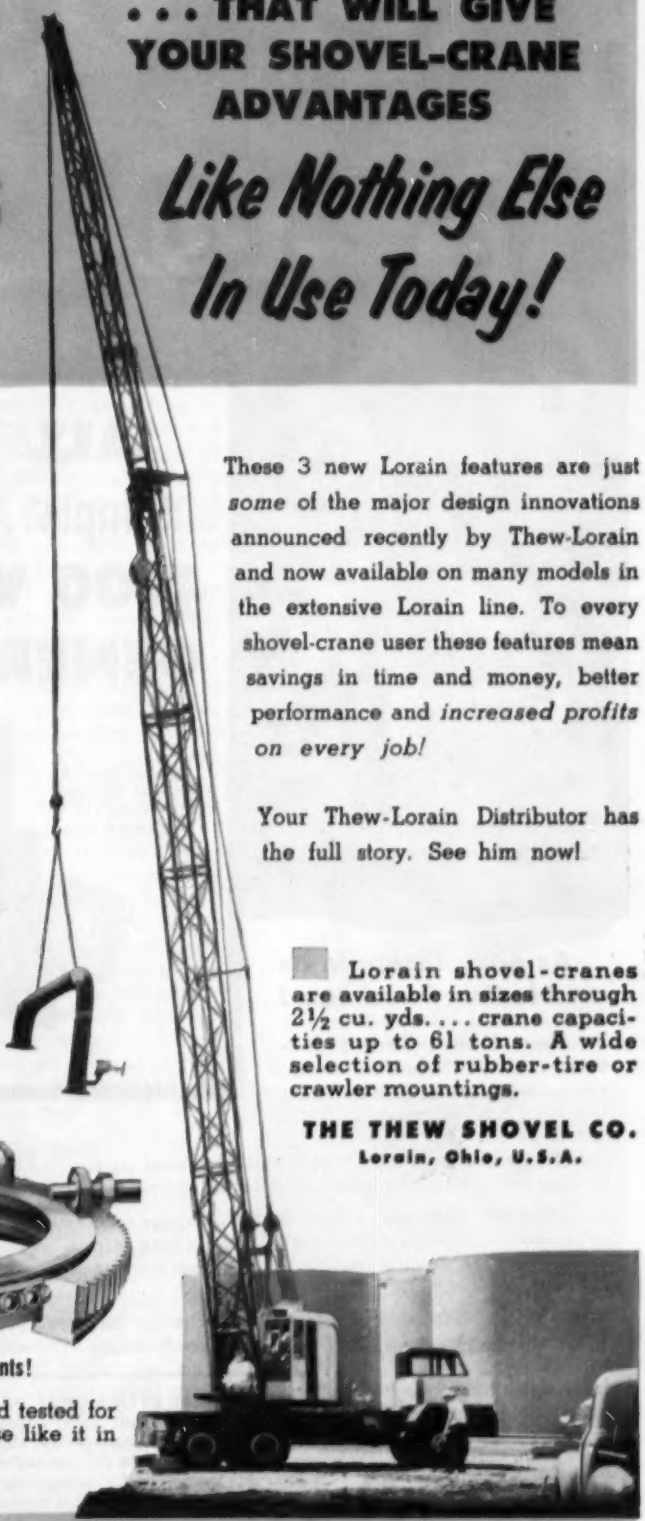

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reduced by wear to about 8 in. Unlike diamond blades, abrasive blades are more economical when sawing fresh concrete. Therefore, the sawing is usually done as *early* as possible. But the concrete must be hard enough to withstand raveling or damage by washing action of the cooling water.

Recently a nylon-reinforced blade which saws without use of water has been used successfully on several projects. In their present stage of development, these blades are not as efficient as the water-cooled type. However, this may be offset by reduction in raveling and washing which sometimes occurs during early sawing. The elimination of equipment and man-power for hauling water helps to offset the increased blade cost. It is to be expected that more economical designs will be developed, as has been true of other type blades.

When to Saw

Longitudinal joints may be sawed at any time before the pavement is opened to traffic. For reasons of economy, with abrasive-type saws, the joint may be sawed early —4 to 8 hr after the pavement is placed. With diamond blades, sawing may be delayed for 7 to 21 days, with resulting increased blade life.

The dummy-groove type of longitudinal joint is formed by placing a metal plate in a vertical position in the plastic concrete. To assist in inserting this plate, a cutting wheel mounted on a bridge is used to force large pieces of coarse aggregate to either side or below the plate.

The plate usually is inserted after the finishing machine and before the longitudinal float has passed. A check should be made to insure that it is in a vertical position and in proper location after passage of the longitudinal float. In some instances the plate is inserted after the longitudinal float, but then it becomes more difficult to restore the smooth surface, since only hand tools can be used for this work.

The plate is usually raised slightly as soon as the concrete has attained sufficient firmness so that it does not slump into the space left below. The edges of the concrete are then rounded to a radius of about ⅛ in. The plate is carefully removed later when the concrete has hardened sufficiently to hold its shape and not be damaged. The joint then should be edged again, to close any small cracks which may have occurred. If removal is delayed too long, the cracks may not knit and will result in unsightly spalls. Sometimes the plate is removed before edging, in which case this operation is performed with a double edger.

How to Set Strips

The procedure for installation of a premolded strip is similar to the method used in making a dummy groove-type joint. A groove is cut in the slab, and the premolded strip, protected by a metal shield, is inserted. The shield is removed immediately. The ribbon type of premolded strip is installed by a self propelled bridge which opens a groove in the fresh concrete with a plowlike device. The ribbon is guided into this groove.

Both types of joints have performed satisfactorily when properly installed. However, if the concrete is not of suitable consistency, there is considerable danger that the premolded strips will be displaced from their proper position during finishing. They must remain vertical during the finishing operations and their upper edge should be just under the surface of the concrete. If they curl up or are bent, the concrete will not crack in the proper location and an irregular crack will result. Also, if the top of the insert is as much as ¼ in. below the surface of the pavement, unsightly spalling will occur. This type joint does not provide space for sealing material. However, this is not serious if the two adjacent slabs are held together by tiebars.

How to Set Tie Bars

When a joint is of the sawed cleft or surface-groove type, tiebars may be set before concrete is placed (held in position by metal pins) or the bars may be impressed in the concrete during finishing operations. Various mechanical devices have been developed to help install tiebars in their proper position. If distributed steel is used, the tiebars should be placed below the mesh at approximately the center of the slab. If a deformed metal plate is used, the plate is perforated at proper locations for installation of the tiebars, which are held in position by the hole in the plate and an end pin.

(Continued on page 126)

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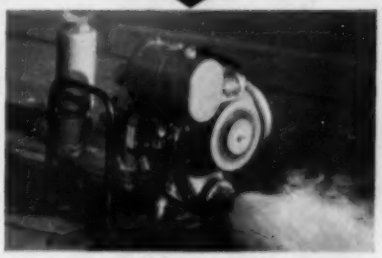

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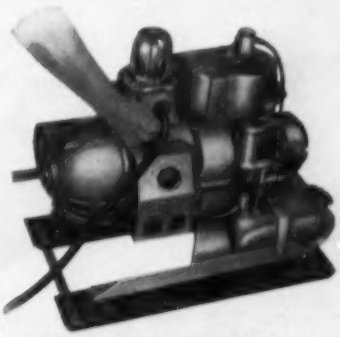

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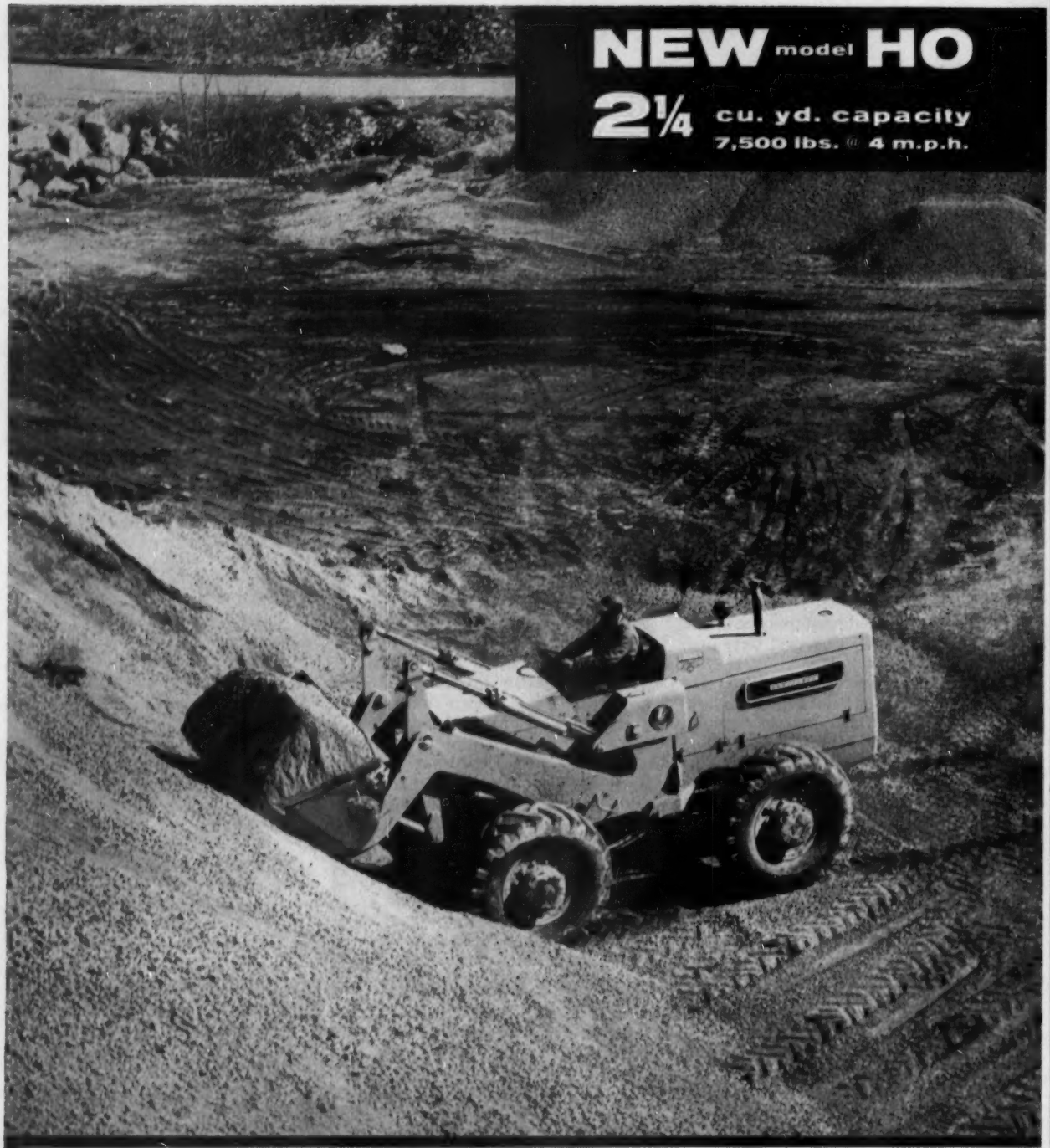

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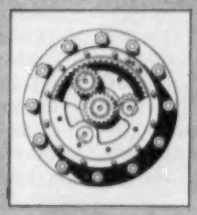

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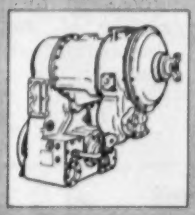

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PAVING... Continued from page 123

Transverse Joints

Transverse joints may be construction, contraction, or expansion joints. Various types are shown in Fig. 3. Except for tied construction joints, transverse joints should be continuous across the entire width of any paved area.

Construction joints, whenever possible, are placed at either a contraction or expansion joint. When so placed, they should be built as shown in sketches D or E of Fig. 3. If they do not occur at one of these joints, they should be at least 5 ft from the nearest joint and are built as a keyed joint with tiebars similar to a longitudinal construction joint.

Contraction joints can be constructed in the same manner as any of the surface groove types of longitudinal center joints. They may or may not be provided with dowels or other transfer devices. If dowels are used, they should be held accurately parallel to each other and to the centerline and surface of the slab in a wire framework that is staked firmly in place.

It is especially important that the dowels be parallel to the pavement surface. Where the pavement is on a sloping grade, dowels will not be in a horizontal plane. Their proper position should be checked with a carpenter's type level that has adjustable supports so it can be set to center the bubble when resting on the forms. Then when the bubble is centered with the level's supports resting on the dowels, the latter will be parallel to the slab surface.

The free end of the dowels should be treated to prevent bond. In many installations, opposite ends of alternate dowels are greased. One treatment which has proved satisfactory consists of two coats of tar paint and a brush coat of MC-2 asphalt.

It is essential that the joint be constructed over the center of the dowel assembly. At the time the dowels are placed, the location is marked on the forms or by a stake just outside. This serves as a guide to the location of the joint after the concrete has been placed. If the joint is to be sawed, a mark

(Continued on page 130)

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can also be installed as a PITLESS SCALE—saves on expensive pit costs

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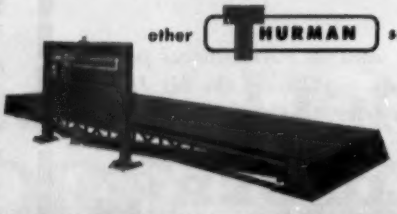

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Liquid Weighing Scales
Portable Truck Scales
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THURMAN

Precision Products since 1918

THURMAN MACHINE COMPANY, DEPT. N, 156 N. 5th STREET, COLUMBUS, OHIO

LIMA

LIMA CRANES

. . . with mountings for every need

Cranes—Crawler mounted, Truck mounted—Wagon mounted. Baldwin-Lima-Hamilton builds them all and in sizes that will best meet your requirements. When mounted on rubber they are available in capacities up to 50 tons. They will go anywhere you care to drive a truck and at speeds up to 25 m.p.h. For work where mobility is not an important factor, LIMA crawler mounted cranes can be furnished in capacities up to 110 tons.

To increase their range of usefulness a variety of attachments are available—shovel, dragline, clamshell, pullshovel and pile driver. Each attachment is interchangeable. For fast, more efficient crane service buy the crane that is first in quality—first in safety and reliability—BUY LIMA.

CRAWLER TYPE

- available in capacity up to 110 tons
- travel speed up to 1 m.p.h.
- all major operations air controlled except types 34 and 44
- independent boom hoist
- long-wide crawlers for greater stability

TRUCK TYPE

- mounted on LIMA 10 wheel truck carrier
- powered by two engines (one in carrier, one in rotating frame)
- travel speed, 25 m.p.h.
- types 24, 34, 44, 54 and 703 available with truck mounting

WAGON TYPE

- types 24, 34, 44, 54 and 604 available with wagon mounting
- one engine powers all operations including travel
- one operator controls all operations from cab
- rotating assemblies have same basic features as corresponding crawler type machines.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

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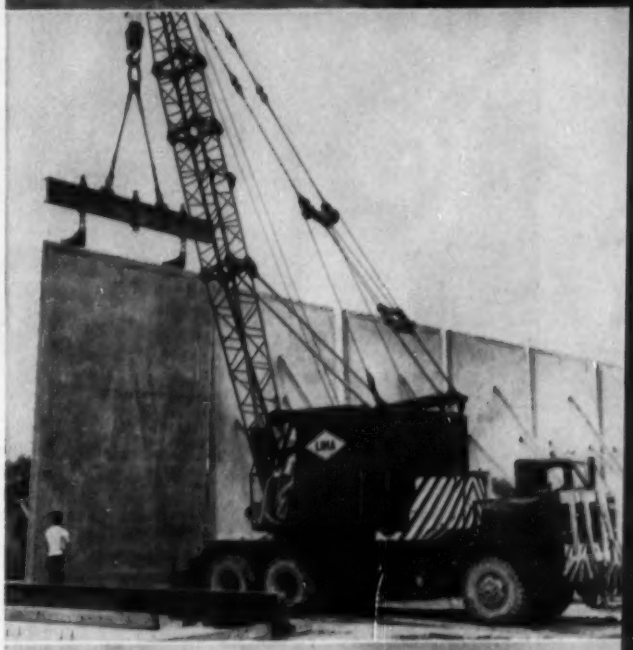
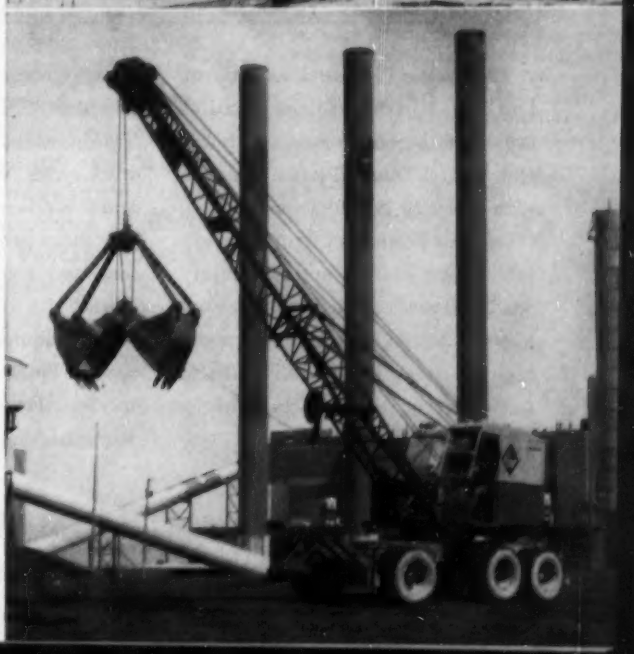
Construction Equipment Division · LIMA · OHIO · U. S. A.





Two of the fleet of 28 Euclid 46TD 22-Ton Dump Trucks equipped with Fuller 10-F-1220 Transmissions, and operated by Nello L. Teer Company, Durham, North Carolina.

Fuller 10-Speed Transmissions handle Teer's tough hauling assignments

The Nello L. Teer Company of Durham, North Carolina, handles tough hauling assignments with Euclid 22-Ton Dump Trucks equipped with Fuller 10-F-1220 Transmissions.

On the boulevard construction job shown above, approximately 3,000,000 yards of dirt and rock were removed to add 80 feet to the present highway along Ohio River bluffs so steep that in many places a triple-bench system was necessary.

Says George Walker, Teer's Master Mechanic: "The heavy-duty Fuller Transmissions paid off in much faster work cycles. We get more work time and less downtime through the right gear ratios provided by Fuller to meet load and grade with shorter, easier shifts."

More equipment owners and users specify Fuller than any other transmission. From the 110 models, semi-automatic and full-manual control, for trucks from 100 to 400 hp, engines from 330 to 1440 cubic inches, select THE Fuller Transmission designed to do your job better and at less cost . . . ready to help you move more for less. Check with your local truck dealer for the *right* Fuller Transmission for your job.

FULLER MANUFACTURING COMPANY
TRANSMISSION DIVISION • KALAMAZOO, MICH.

Unit Drop Forge Div., Milwaukee 1, Wis. • Shuler Axle Co., Louisville, Ky. (Subsidiary) • Sales & Service, All Products, West. Dist. Branch, Oakland 6, Cal. and Southwest Dist. Office, Tulsa 3, Okla.

BLAW-KNOX Paving Equipment knocks out yardage in record time

82,950

sq. yds. of 10-in. reinforced concrete poured in 23 ten-hour working days

• This is the record Williams Paving Company made on the northeastern extension of the Pennsylvania Turnpike System. Williams set this record by paving in 24-ft. widths. Average pour was 3,606.78 sq. yds. per 10-hour day and the top day was 4,533 sq. yds. or 1,700 lineal feet of 24-foot pavement put down. Key to this high speed operation was Blaw-Knox paving equipment which included two MultiFoote Pavers, Spreaders and Road Forms.

You will set profitable records on your single- or dual-lane paving jobs, too, when you use Blaw-Knox "Complete Package" paving equipment. From subgrade to finished pavement, this equipment is designed for high speed coordinated work. More and more contractors all over the country are taking advantage of one-source, one-responsibility economies of Blaw-Knox "Complete Package" paving equipment and methods.

THE BLAW-KNOX "Complete Package"

Cement Batching Plant • Aggregate Batching Plant • Precision Subgrader • Self-Aligning Steel Paving Forms • Curb and Gutter Forms • Base Paver • Road Widener • Trench Roller • MultiFoote Paver • Concrete Spreader • Concrete Finishing Machine • Clamshell Buckets • Concrete Buckets • Hi-Boy Trukmixers • Ready Mix Batching Plant

50th Anniversary BLAW-KNOX 1906-1956

38 CHARLESTON AVENUE

BLAW-KNOX COMPANY, Mattoon, Illinois

Construction Equipment Division

Continued from page 126

should be made in the concrete at each side of the slab, or a string may be stretched and a mark made in the concrete surface.

The dummy groove type of contraction joint is constructed in a manner similar to the longitudinal joint. The metal plate for forming a dummy groove contraction joint is usually installed after the passage of the finishing machine and ahead of the longitudinal float.

This type of contraction joint

SMALL RADIUS TOOL edges longitudinal construction joint. Keep vertical leg perpendicular, or spalling may later develop.

requires careful attention to construction details, if it is to have satisfactory riding qualities. To achieve this, the edges of the groove should be rounded with an edger having a radius of not more than ⅛ in., and the surface should be tested with a 3- or 4-ft straightedge.

The use of dummy groove joints requires a longer time interval between placing of the concrete and finishing of the joint. This delays curing of the concrete, and in hot, dry, windy weather may be a serious disadvantage.

The premolded or ribbon type contraction joint is sometimes preferred because after installation no further finishing usually is required. But this type will cause spalling if not held vertical or if the top is buried below the surface.

Joint strips are more apt to be displaced during finishing operations when used to form transverse joints than when used for longitudinal joints. If displacement occurs when the joints are placed close to the surface ahead of the longitudinal float, the strips can be installed behind the float. However, this requires additional hand finishing to secure a satisfactory surface.

Premolded joints have an advantage in that they do not delay curing operations. This is important in hot, dry, windy weather when it is essential to apply the curing material as early as possible to prevent excessive loss of moisture from the concrete by evaporation.

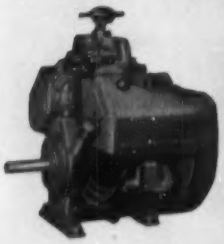
Sawed joints have the advantage of not interfering in any way with finishing operations. Additional advantages are that there is no chance for over-manipulation

(Continued on page 135)

WISCONSIN-POWERED

CONCRETE SPAN-SAW

Cuts Costs . . . Speeds Up Work



This V-type 4-cylinder model is one of two Wisconsin Engines that operate the Concrete Span-Saw.

Here is an interesting construction application for Wisconsin Heavy-Duty Air-Cooled Engines that really demonstrates the rugged serviceability of these engines.

Used for diamond-sawing control joints in new highway and airport concrete, this Felker Di-Met Span-Saw spans the concrete slab, riding either the header boards or concrete. Powered by two Wisconsin Air-Cooled Engines, this multi-bladed machine saws control joints at desired intervals and, according to the builders (Felker Mfg. Co., Torrance, Calif.), speeds up work, cuts costs and minimizes manpower.

Wherever there's tough, dirty work to be done, Wisconsin Engines rate "Number One" in steady-going performance, low-cost maintenance and heavy-duty dependability. Every Wisconsin Air-Cooled Engine has such features as tapered roller bearings at BOTH ends of the crankshaft, rotary type high tension *outside* magneto, pump-circulated lubrication and efficient AIR-COOLING at all temperatures from extreme sub-zero to 140° F.

All models (3 to 36 hp.) can be furnished with electric starter and generator, or starter only and may be equipped with Stellite exhaust valves and valve seat inserts, clutch and clutch reduction assemblies, and rotating screen. Reduction assemblies available for all models except the VG4D.

You can't do better than to specify "Wisconsin Power" for your equipment. Write for Bulletin S-188.

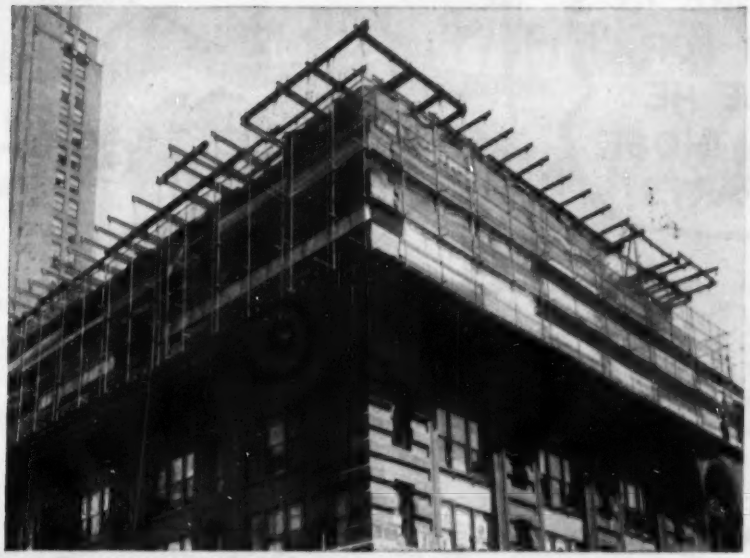
WISCONSIN MOTOR CORPORATION

World's Largest Builders of Heavy-Duty Air-Cooled Engines

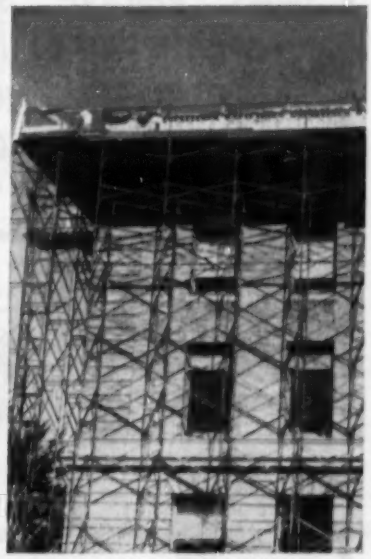
MILWAUKEE 46, WISCONSIN

(Advertisement)

Scaffolding Methods . . . for Cornice Removal

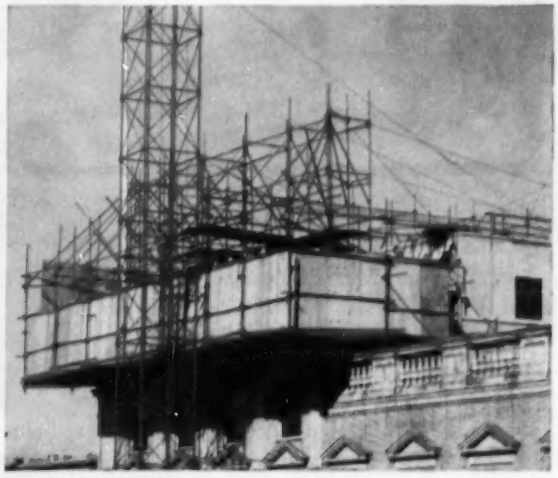


ROOF SUSPENSION—3-level hanging "TubeLox"® Scaffold, with protective "Gold Medal" Sidewalk Bridge, helps in removal of the wide overhanging cornice and terra cotta ornamentation extending a full story and a half down from the top of the First National Bank Building in Chicago. Peter Masterson Co., contractor, exposed the top flange of the roof beams and PS Co. anchored 7" double outrigger steel I-beams to them with double beam clamps. 8,500 lineal feet of "TubeLox" Scaffolding, with canopy, suspends from the outrigger beams to provide three working levels.



FROM THE GROUND—This 350-frame "Trouble Saver"® Sectional Scaffold, built up from the ground for cornice removal on Simmons College, Boston, is used on this low building because it was the most economical and practical method. New Const. Co., contractor. U.L. approved.

HANGING TO THE JOB—"Gold Medal" Suspended Scaffold Machines are hung from double 7" I-beams attached at roof level for this decoration removal job on the America Fore Building, Chicago. Clarence Cross Co., contractor, finds this method to be safe and efficient in moving workmen from level to level quickly. U.L. approved.



CANTILEVER—To remove cornice from the tall Clift Hotel, San Francisco, a unique scaffold made of 11,000 lineal feet of "TubeLox" Scaffolding is cantilevered over the parapet. The scaffold is tied back each bent by roof hooks, cables and turnbuckles. Phoenix Simpton Co., contractor, also tied a 240' "Gold Medal"® Heavy Duty Hoist Tower into the scaffold and building.

FOR GREATER SAFETY...EFFICIENCY...ECONOMY

THE PATENT SCAFFOLDING CO., Inc.

38-21 12th Street Dept. CM&E Long Island City 1, N.Y.
***West Coast:* 6931 Stanford Ave., Los Angeles 1, Calif.**
Branches in all principal cities
In Canada: 355 Dufferin St., Toronto

GET FREE HELPFUL TIPS on scaffolding for cornice removal and other work—in May issue, "Scaffolding Methods."

The Patent Scaffolding Co., Inc.
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Send me free copy of May issue "Scaffolding Methods."

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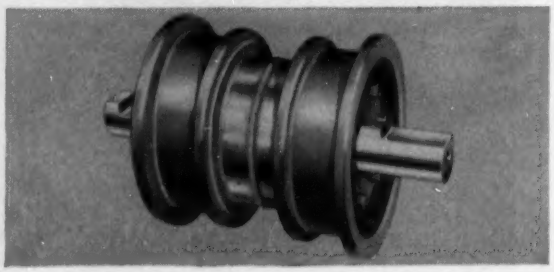
Do you believe one make of parts is as good as another?

Take track rollers. You can buy substitutes that look on the outside like Caterpillar originals. But a Cat-built track roller has deep hardened rims of forged steel. Forging keeps rims free from the accidental defects often found in castings. The roller shaft is one-piece and induction-hardened. The seals are self-aligning, of double-tanned leather to *really* keep lubricant in, water and dirt out. You're *sure* of extra wear, extra life —on the toughest jobs.

With substitute parts, can you be sure of anything?

See your dealer's Parts Representative—better get Caterpillar original parts every time.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.



Steel for CAT* rollers is pretested, forged in special Caterpillar owned dies, precision-machined, scientifically heat-treated and carefully inspected. Why settle for anything less?

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

Paves 26,000-vehicle-a-day boulevard with hot-mix Texaco Asphaltic Concrete

Governor Printz Boulevard in Wilmington, Del., one of numerous major traffic arteries throughout America to be paved with heavy-duty Texaco Asphaltic Concrete.

CONTRACTOR
George and Lynch
Wilmington, Del.

ENGINEERING · RESEARCH · EDUCATION · THE ASPHALT INSTITUTE

MEMBER

Governor Printz Boulevard in Wilmington, Del., is one of that State's most important traffic arteries. Last year, when the average 24-hour traffic on the boulevard passed 26,000 vehicles, steps had to be taken to relieve congestion.

The boulevard has since been widened, then resurfaced completely with a hot-mix, hot-laid wearing surface of Texaco Asphaltic Concrete, spread to a compacted thickness of three inches.

Texaco Asphaltic Concrete is a heavy-duty pavement, whose resilient, flexible qualities enable it to absorb punishing impact year after year with a minimum of upkeep. It is the ideal pavement wherever *heavy* traffic must be served, including turnpikes, vehicular tunnels or bridges, important city streets and trunk highways.

In addition to rugged durability and low maintenance cost, Texaco Asphaltic Concrete has other important advantages for road builder and motorist. It is ready for traffic as soon as compacted. Its highly skid-resistant texture and the sharp visibility of traffic lines on its dark surface are important aids to safe driving. Its resilience and freedom from joints insure lasting driving comfort for motorists.

Helpful information concerning Hot-mix Asphaltic Concrete is supplied in the booklet, "Texaco Asphalt Paving—Plant-mixed Types." This free publication can be secured without obligation by writing our nearest office.

TEXACO

THE TEXAS COMPANY, Asphalt Sales Div., 135 E. 42nd Street, New York City 17

Boston 16 • Chicago 4 • Denver 1 • Houston 1 • Jacksonville 2 • Minneapolis 3 • Philadelphia 2 • Richmond 19

TEXACO ASPHALT

(Advertisement)

How a 5½ yard shovel, spotted on narrow benches, digs and trims a 284′ deep highway cut

Manitowoc 4500 excavates 600 yards per hour for Bruns Coal Company of Zanesville, Ohio, on highway widening job at Steubenville, Ohio

The Manitowoc Model 4500 will move most of nine hundred thousand yards of material to be excavated during the widening and modernization of 1.823 miles of Ohio State Highway #7 . . . Jefferson County, Ohio. Bruns Coal Company is working their 5½ Yd. rig two 8-hour shifts per day, digging through alternate layers of slate rock, coal seams, slate clay, flint clay and boulders. Blasting ahead of the machine cannot be uniform because of the layered quality of the soil, yet the Manitowoc digs as much as 600 yards per hour.

Bruns uses six 15 Yd. Euclid hauling units moving spoil from the big cut. The narrow benches are so cramped that the shovel must swing out over the lip of the cut when loading. The Manitowoc has a ground bearing pressure of only 9.6 pounds per square inch . . . (less than most one-yard machines)—and is exceptionally compact for a big machine (tailswing radius 19′4″). These factors plus the elevated pilot house (operator's eye level—15′) warrant record yardages without interruption of highway traffic directly below.

Another Manitowoc feature, the tubular dipper stick, has proven its worth in this excavation where the dipper encounters boulder, coal, slate, and clay during one digging cycle. Twisting, uneven digging forces only dip the dipper slightly and transmit no strain to the boom or shipper shaft, yet lift of the hoist rope maintains an upright dipper position and digging shocks are absorbed without the damage which might necessitate excessive maintenance in any other rig.

Besides the drill rig and hauling units, the Manitowoc is the only other machine on this cut. *Controlled Power* . . . Single diesel engine with a torque converter power take-off gives ample flexible power and speed. 52″ drum brakes and 49″ clutches, are air operated for the smooth, precise control necessary to cut, trim and finish this 284′ deep 1-to-1 slope!

Modern highway construction hinges on the ability and capacity of larger, more efficient equipment. More and more contractors are using Manitowoc Model 4500's for roadwork because of record capacity and extreme mobility. Bid your next job on the basis of a Manitowoc.

Manitowoc Engineering Corp., Manitowoc, Wis.

. . . working in close quarters, Manitowoc hangs over the highway, where traffic continues without stop.

PAVING... Continued from page 130

of the concrete (which can result in spalling) and there is no delay in curing.

The time of sawing transverse contraction joints is much more critical than for longitudinal joints. They must be sawed before the concrete shrinks enough to crack. This time varies with aggregate type, weather conditions, and curing procedure. Even on the same job where all other conditions remain constant, the time of sawing may have to be changed as weather conditions change. With diamond blades, sawing is normally done between 8 hr and 3 days after the concrete is placed. With abrasive blades, sawing may be started within 4 hr and completed at 8 to 12 hr.

Usually, best results are obtained when all joints are sawed in succession. But with hard coarse aggregates, which require diamond blades, it may be more economical to saw control joints at 80 to 100 ft during the early hours of the pavement life. The sawing of the intermediate joints may be delayed until the concrete has hardened. Some intermediate joints do not crack until after the pavement has passed at least one winter. This may result in excessive opening of those joints which do crack.

In sawing contraction joints between long reinforced panels, it is important that the sawing be done during the warm part of the day while the pavement is in compression. Otherwise the pavement may crack ahead of the blade before the entire joint is sawed. If such a crack develops, the rest of the joint should not be sawed. If a crack develops at or near a joint location before sawing, no cut should be made at that location.

In multiple-lane paving, early sawing is essential. Since cracks may develop opposite open joints in lanes already placed, joints must be cut as soon as possible. If random cracks have already formed, the joint should not be sawed. If this occurs frequently, it may be advisable to form the joints or to use premolded strips at locations where the matching joint in the adjacent slab has already opened.

Expansion joints, when used, should be provided with dowels or other load-transfer devices. These are held in position, painted, and oiled as explained under contrac-

(Continued on page 138)

METAL PLATE that forms dummy groove contraction joint is gripped with pliers and removed as soon as concrete will stand without slumping. Joint edges now will be rounded.

MEN OF STEEL

The East Viaduct extension to carry the roadway from the Holland Tunnel to the existing New Jersey Turnpike (Contract N-22) is being engineered and constructed by TERRY.

The story behind the brilliant construction achievements of the great TERRY organization is basically the story of men. Men of proven ability. Men of vast experience. Above all, *dedicated men* who have made it their business to master every facet of engineering, designing, fabricating and erecting. In every sense of the word, *men of steel.*

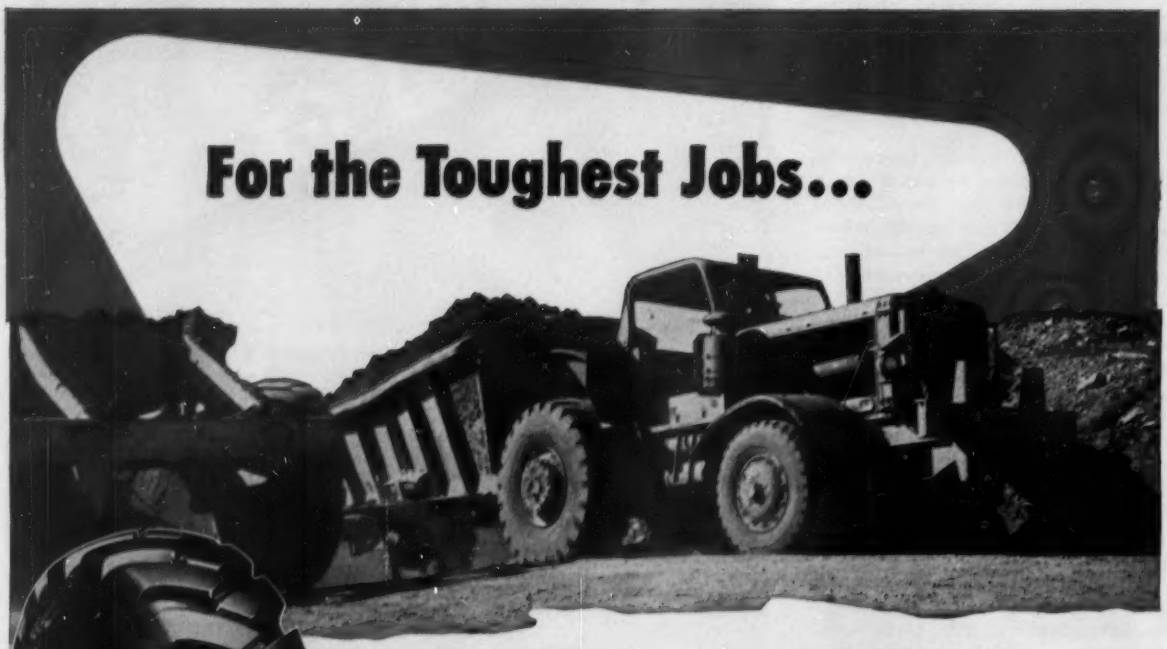
work... not words... tells the story of

TERRY

Steel Contractors, Inc.

Sales & Executive Offices: THE TERRY BUILDING
31 East 27th Street, New York 16, N. Y. • MUrray Hill 9-0011

For the Toughest Jobs...



GENERAL

FEATURING STRONGER-THAN-STEEL NYGEN® CORD

BUILDS THE TOUGHEST TIRE LINE-UP EVER PRODUCED!

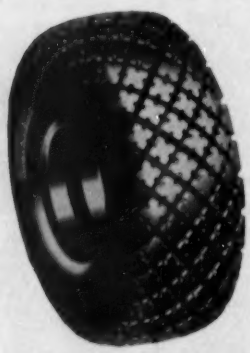
Unexcelled for strength with *exclusive* Nygen Cord, and for ideal crawler-like traction and flotation, The General Tire makes every off-the-road job show a profit. Built big, broad and rugged, they provide utmost protection against job hazards . . . keep units consistently on the move to get jobs done faster.

General All-Duty L. C. M.

General L. C. M.

THE GENERAL TRUCK TIRE

General D. T. L.



General Earthmover

General Tractor Grader

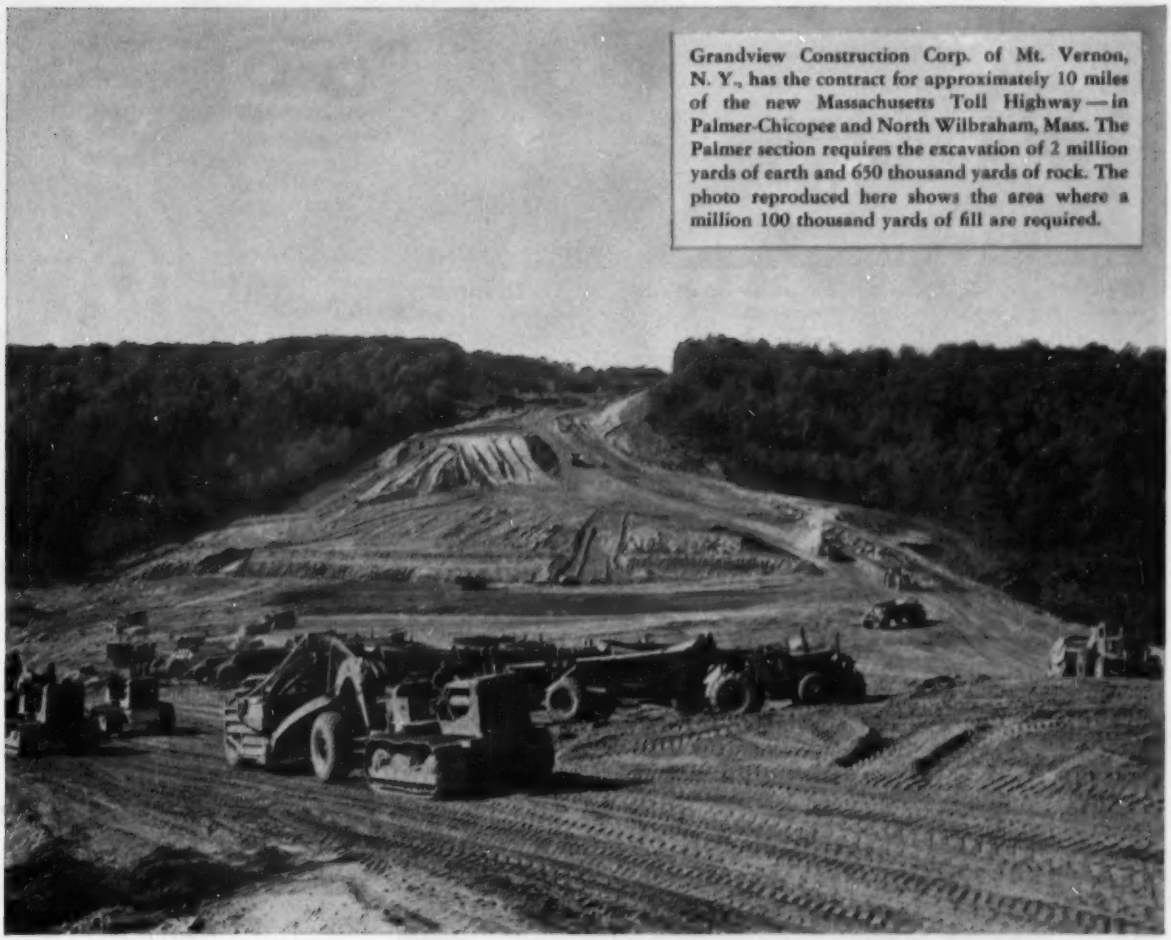
THE GENERAL TIRE & RUBBER COMPANY • Akron, Ohio

SPECIFY GENERALS ON YOUR NEW EQUIPMENT

GULF PRODUCTS *and* FINE SERVICE

keep equipment rolling

on Massachusetts Toll Highway Project



Grandview Construction Corp. of Mt. Vernon, N. Y., has the contract for approximately 10 miles of the new Massachusetts Toll Highway — in Palmer-Chicopee and North Wilbraham, Mass. The Palmer section requires the excavation of 2 million yards of earth and 650 thousand yards of rock. The photo reproduced here shows the area where a million 100 thousand yards of fill are required.

LIKE other leading contractors, Grandview Construction Corp. is mighty careful about controllable costs, particularly maintenance expense.

And that's an important reason why the Grandview Construction people selected Gulf as their supplier of petroleum products on the Massachusetts Toll Highway Project. They have found that Gulf quality lubricants keep their maintenance costs at rock bottom levels . . . and they appreciate Gulf's prompt delivery service and helpful petroleum engineering counsel.

Send the coupon for your copy of our new brochure, "Gulf and Your Business."

GULF

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1822 Gulf Building, Pittsburgh 30, Pa. CM

Gentlemen:

Please send me a copy of your new brochure, "Gulf and Your Business."

Name.....

Company.....

Title.....

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PAVING . . . Continued from page 135

CONCRETE SAWING is increasingly popular method of making joints. Blades are usually diamond-tipped steel or mesh-reinforced abrasive. Water cools and lubricates them.

tion joints. The movable end of each bar should be provided with a tight-fitting metal sleeve which has a stop to insure that space is left at the end for the bar to move into as the joint closes.

The expansion filler should be wood or some type of non-extruding material. Unless the filler is wood, a metal shield with cap should be used to hold it in proper alignment during concreting operations. It is staked firmly in place at right angles to the centerline and surface of the slab. The filler is cut to the shape of the cross-section and fitted around or into any keyways. The top of the filler should be approximately 1 in. below the surface to provide space for sealing material.

After the pavement has been finished, the concrete above the joint is removed. Then the shield and cap are taken out and the joint edged. It is important that the space for the sealing material have a width equal to the thickness of the joint filler and that it be directly above the filler.

All concrete must be removed from above the joint filler and at the ends for the full thickness of the joint. When one lane abuts another already in place, it is imperative that the filler fit tight against the end of the filler in the older concrete. Unless these precautions are taken, a plug of concrete will span the joint. Then when the joint closes a spall will result.

(Continued on page 141)

Here's Why . .

TRANSCRETES

Pour more and better concrete on any job . . easier . . faster . . at less cost for BIGGER PROFITS!

SWING-OUT HOPPER swings in for charging — swings out for discharge so concrete can come through big UNOBSTRUCTED opening in full, easily controlled stream.

EXTRA LARGE DIAMETER DRUM HEAD — DEEP "L" SECTION BLADES for faster, more thoro, more efficient mixing of any slump concrete.

TROUBLE-FREE FLOATING DRIVE that eliminates ALL the troubles of ordinary rigid drives. Simplest chain take-up of all — only one nut to turn.

HANDIEST, SIMPLEST CHUTE ARRANGEMENT OF ALL. Easier to handle on any kind of pour — no matter how tough the job.

A SIZE TO FIT EVERY NEED — 4 Models, 3½ to 7 yard mixing capacities. CONSTRUCTION MACHINERY CO., Waterloo, Iowa

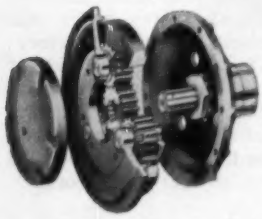
Write for NEW, FREE

'56 TRANSCRETE Catalog

CONSTRUCTION MACHINERY CO., Waterloo, Iowa

Meet the axle . . . . . that has outlawed broken axle shafts

Primary Reduction in the center section, by helical bevel pinion and gear.



Second Reduction in the drive wheel —a sun gear splined to the axle shaft and three planet gears driving an internal gear in the inner periphery of the wheel, as close as possible to the point where tractive effort is applied. Two types: steering and non-steering.

Here is a most impressive fact:

This planetary driving axle developed by Clark especially for heavy duty off-highway machinery has established a record of performance in which broken axle shafts are practically unknown.

Here truly was a challenging design problem: To develop an axle that would (1) handle the terrific torque demands of punishing construction jobs; and (2) provide sustained highway speeds up to 27 mph.

Both these stiff requirements are fully satisfied by this Clark Planetary Axle. 70% of the torque load is taken *off the shafts*—transferred to the planetary assembly in the wheel. Shaft wind-up and surge are virtually eliminated—in contrast to axles of conventional type, whose shafts get the total shock of full torque. Power flows more smoothly—no chatter, less "digging" in soft ground. No wonder broken shafts are practically unknown.

Are you seeking ways to improve your own machines? It's high time you got acquainted with this axle that has outlawed broken shafts. A helpful bulletin will be sent on request—use the coupon.

CLARK EQUIPMENT COMPANY • AXLE DIVISION, Buchanan 6, Michigan

CLARK® EQUIPMENT

Please send illustrated bulletin on the Clark Planetary Axle.

Name_____ Position_____

Firm_____

Address_____

City_____ State_____

Set your sights on an HD-6G

for top performance
for top dependability
for top versatility

1½ yd bucket **55 belt hp** **19,600 lb**

and all these exclusive on-the-job advantages important to both owners and operators . . .

Allis-Chalmers long-life diesel engine — power that handles tractor and bucket demands with ease.

Heavy welded-steel shovel side frames and low stabilizer — provide greater strength, low center of gravity, outstanding visibility.

Full-flow filtering — filters oil three ways, provides long-life protection for hydraulic system.

Six truck-wheel stability — almost 7 ft of track on the ground for superior balance.

1½-yd two-position bucket — handles big loads efficiently in loose material or hard-packed dirt.

All-steel, box-A main frame — soaks up shock loads, protects the entire power train.

One-piece steering clutch and final drive housing — line-bored for true alignment of shafts and gears.

Straddle-mounted final drives— with bearings on both sides of gears to maintain correct gear tooth alignment.

Simplified lubrication (including 1,000-hour lubrication intervals on truck wheels, idlers and support rollers) provides extra working time.

Unit construction —makes service easier, faster. Major units can be removed without disturbing adjacent assemblies.

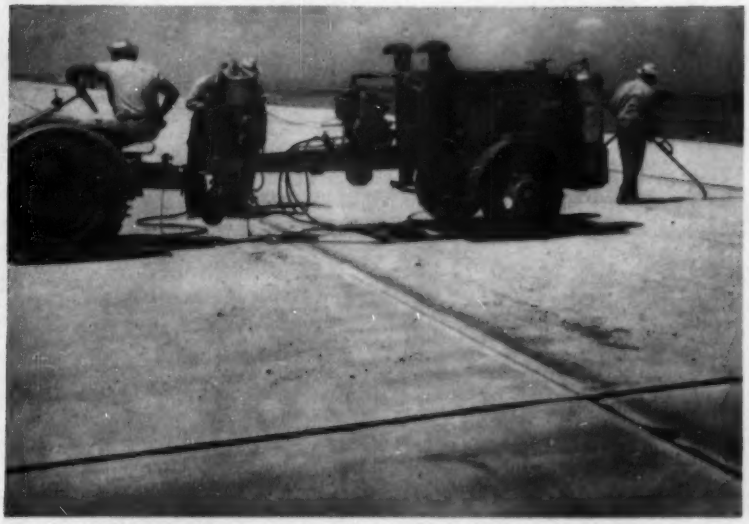
Plus husky wrap-around radiator guard . . . simplified piping . . . heavy-duty truck frames . . . heavy-duty, roller-bearing truck wheels . . . matchless control . . . and the convenience of 24-volt direct electric starting.

Check the complete service program offered by your Allis-Chalmers construction machinery dealer. His factory-trained servicemen, factory-approved facilities, and stocks of True Original Parts keep your equipment operating properly . . . provide the kind of service that saves you money. See him soon; he'll be glad to show you an HD-6G at work.

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

PAVING . . . Continued from page 138



JOINT SEALING with hot-poured material, as shown here, requires dry slot to prevent sealer from foaming. Excess material should be removed to insure smooth-riding joint.

Sealing Joints

All joints in concrete pavements should be sealed before they are opened to traffic. Both hot-poured and cold-applied rubber asphalt materials are in general use. They must be applied under pressure when narrow sawed joints are being filled, and the same equipment generally is used for dummy groove joints. All joints should be free of dust and loose particles when filler is applied.

Hot-poured material is melted in an oil bath type kettle to avoid overheating. The joint must be dry to prevent foaming of the hot material.

Cold-poured material can be applied in the presence of moisture. Joints can be filled with this as soon as the concrete is stiff enough not to be damaged by the nozzle that inserts the joint filler.

Joints should be filled to within about ¼ in. of the top. Any excess of material is removed to insure a smooth-riding joint. On some projects, the slab areas adjacent to the joint are painted with whitewash to facilitate removal of excess sealer. Whitewash prevents the sealing material from bonding to the slab. Cold-poured material should be covered with paper to prevent pickup by vehicle tires. The paper can be left in place until worn off by traffic.

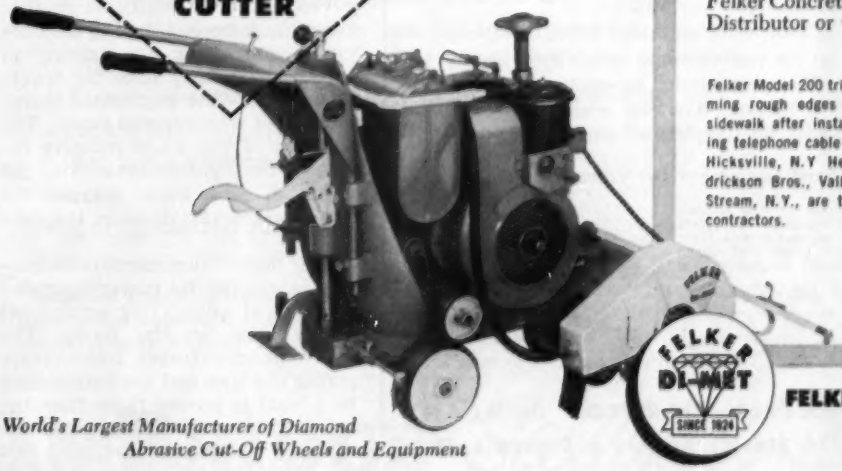
Curing

When concrete is mixed, it contains sufficient water to hydrate the cement. The purpose of curing is to retain this water in the con-

(Continued on next page)

If you saw only 10,000 feet per year this pays for itself!

FELKER MODEL 200 CONCRETE CUTTER



That's a fact! If you pay 15¢ to 18¢ per foot for concrete sawing—a common price for contract work, you can buy a Felker Model 200, equip it with Felker blades and cover labor costs on just 10 days' cutting per year! Check your next years' program—See how much you can save by ordering this low cost machine!

Felker Model 200 is an all-around machine, small enough for good maneuverability, husky enough for heavy production jobs. 13.5 h.p. Wisconsin, hydraulic lift and downfeed to blade. Get our circular on the Model 200 and other Felker Concrete Cutters from your Felker Distributor or write direct.

Felker Model 200 trimming rough edges of sidewalk after installing telephone cable in Hicksville, N.Y. Hendrickson Bros., Valley Stream, N.Y., are the contractors.

FELKER DI-MET SINCE 1924

World's Largest Manufacturer of Diamond Abrasive Cut-Off Wheels and Equipment

FELKER MANUFACTURING CO.
Torrance, California

Continued from page 141

crete during the early life of the pavement to aid in the development of its durability, strength, and wear resistance.

Curing of concrete is neglected more often than any other phase of construction. Yet neglect of this important step will have an adverse effect on pavement properties.

Lack of curing may result in excessive concrete shrinkage and loss of water necessary for complete hydration. A poorly cured pavement will not have the strength, durability, or resistance to wear of concrete that is properly cured. It is especially important to provide adequate curing during the first few days, and even more important during the first few hours after concrete is placed. Delay in starting curing, particularly in hot dry weather, may result in surface cracking.

BURLAP for curing is wet when placed and kept wet. Don't use old sacks that once contained sugar, salts, or fertilizer.

Any of several different curing methods will give satisfactory results when correctly applied. Some specifications permit the use of a single method throughout the entire curing period. Others require one method during the first 24 hr and a different one during the remainder of the curing period.

When a single method is used, it usually consists of wet burlap or cotton mats, an impervious membrane, or waterproof paper. Wet burlap or cotton mats supply additional water to replace that lost by evaporation. Impervious membranes and waterproof papers are designed to prevent evaporation from the surface. They have the advantage that usually no further attention is needed during the curing period. They are gaining in favor, particularly since the development of white pigmented membrane and white coated paper. The addition of the white coloring increases the light reflectance of the material, and thus reduces the temperature variations in the concrete.

The impervious membrane usually is applied by power-operated mechanical spraying equipment which rides on the forms. The spray nozzles travel transversely across the slab and are surrounded by a hood to protect them from the wind. The forward progress of the

(Continued on page 144)

". . . the Master goes faster than the mixers."

"Our Master Screed is a one-man-gang. It does everything at once, faster than we've done it before. We've upped our schedules and really cut our costs."

General contractors and road builders say that, because *in one time over,* the Master Vibrating and Finishing Screed strikes off, vibrates and compacts—from top to bottom—even the lowest slump concrete, making a denser, stronger slab than any other way we know of.

It eliminates honeycomb and form work on bridge decks, molds the concrete in crowns, arcs or flat for roadways and *cuts 'way down on finishing time for any slab.* This cost-cutting, top-quality screed is inexpensive and economical to operate. Available with arc or flat. See your Master distributor today for complete information.

Retractable Wheels Standard Equipment On Vibratory Screed

Screed in operating position. When lever is up, screed rests on work surface, ready to go. Gives high speed strike-off, compaction, and finish.

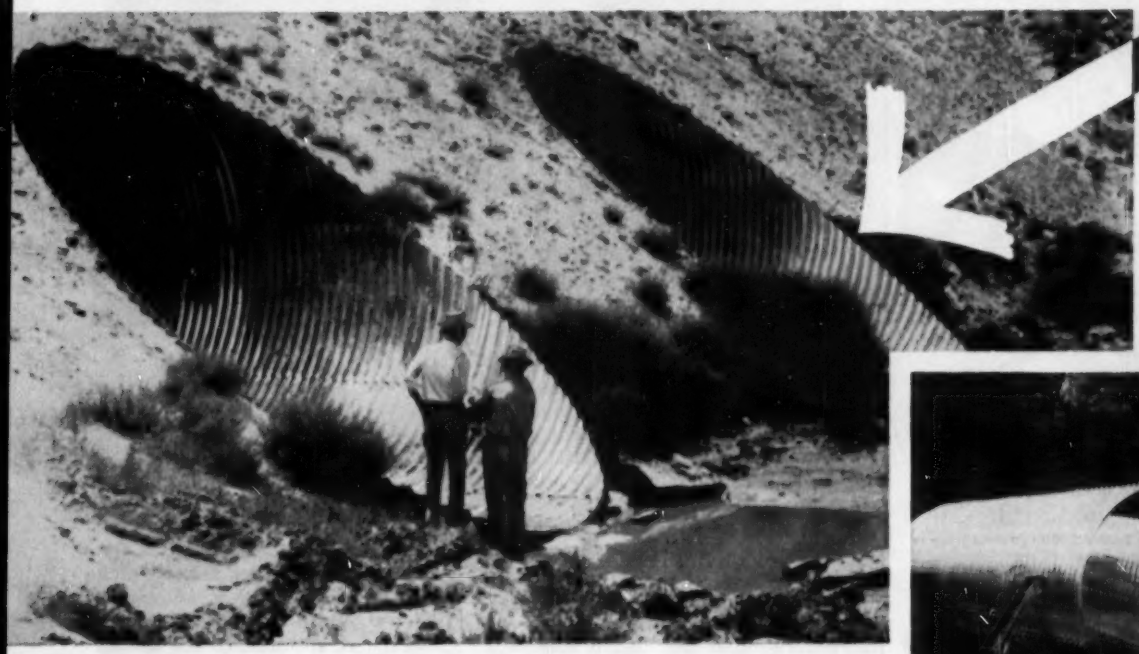
Lever down, screed beam up, ready to roll easily for another pass. Special retractable lightweight flange wheels increase mobility, step-up operating speed.

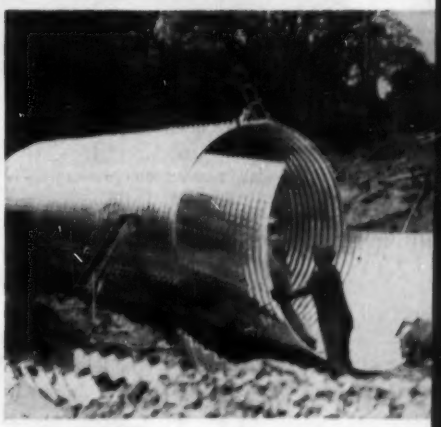
MASTER **MASTER VIBRATOR COMPANY**
134 Stanley Avenue • Dayton 1, Ohio

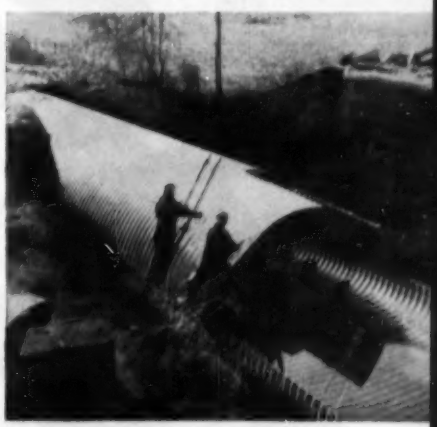
NOW AVAILABLE

AMBRIDGE Sectional Plate

for any shape or size of pipe, arch, or pipe-arch







to save you time and money in building low-cost drainage structures

AMBRIDGE Sectional Plate for Pipes, Arches and Pipe-arches is fabricated to meet the specifications of the American Association of State Highway Officials and can be adapted to all state, railroad and government specifications.

The plate is fabricated with 2" deep corrugations on 6" centers with standard punching, *and galvanized after fabrication.*

AMBRIDGE Sectional Plate is furnished to accommodate any shape or size of pipe, arch, or pipe-arch, complete with bolts. Special details, such as asphalt coating, hook bolts, beveled ends, and skewed ends, are furnished as specified for each job.

For further information, we suggest that you contact the office nearest you. Or, an inquiry direct to our Pittsburgh headquarters will bring detailed information.

AMERICAN BRIDGE DIVISION, UNITED STATES STEEL CORPORATION • GENERAL OFFICES: 525 WILLIAM PENN PLACE, PITTSBURGH, PA.

Contracting Offices in: AMBRIDGE • ATLANTA • BALTIMORE • BIRMINGHAM • BOSTON • CHICAGO • CINCINNATI • CLEVELAND • DALLAS • DENVER • DETROIT • ELMIRA • GARY HOUSTON • LOS ANGELES • MEMPHIS • MINNEAPOLIS • NEW YORK • ORANGE, TEXAS • PHILADELPHIA • PITTSBURGH • PORTLAND, ORE. • ROANOKE • ST. LOUIS • SAN FRANCISCO • TRENTON

UNITED STATES STEEL EXPORT COMPANY, NEW YORK

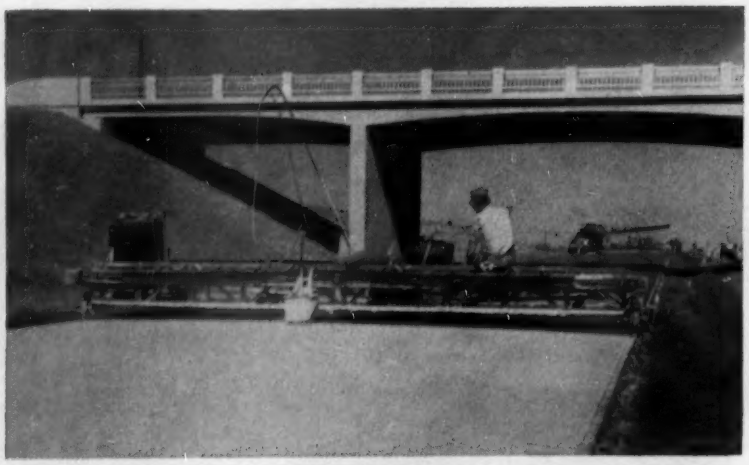
AMBRIDGE *Sectional* PLATE USS

UNITED STATES STEEL

A.S.A.
certified
CHAIN

The
TSUBAKIMOTO CHAIN
Mfg. Co., Ltd.
620, Tsurumi-cho, Joto-ku
OSAKA, JAPAN
Telegram: TSUBAKI
All inquiries receive prompt
and careful attention.
WRITE FOR ILLUSTRATED
BULLETIN
Dealerships open!

PAVING . . . Continued from page 142



SPRAY MACHINE rides on forms, applies white-pigmented curing compound to pavement. Spray nozzles travel across slab to give the recommended two-coat overlapping coverage.

spraying machine is regulated to give a two-coat overlapping coverage. The quantity applied should be as recommended by the compound manufacturer to secure proper moisture retention. If there are irregular areas where application by hand-operated sprayers is necessary, the surface is given two coats at right angles to each other.

It is essential that there be no separation of the liquid and solid components of pigmented curing compounds. To insure this, the drums in which the compound is shipped usually are provided with agitators which are operated during the curing process.

If rain damages the membrane before it hardens, or if it is broken in any way so as to lose its water-retentive properties, it should be replaced.

Curing compounds should not be allowed to flow into dummy groove joints, as this will prevent adhesion of the joint seal to the concrete. Joints should be covered by a rope or narrow board before the curing compound is applied. The sides of the pavement are sprayed with membrane as soon as the forms are removed.

If waterproof paper is used for curing, it is placed as soon as possible without marring the surface of the concrete. Adjacent sheets are lapped, and the paper turned down over the pavement edges and secured by a continuous bank of earth. No paper should be used with tears or holes that affect its serviceability and effectiveness as a curing medium. Workmen must not be permitted to walk on paper when in place on the concrete. Otherwise many small holes will develop in the paper.

If wet burlap or cotton mats are used for curing, the mats may be of reclaimed materials provided they do not contain any substance which would be deleterious to the concrete. Burlap from sacks which have contained sugar, salts, or fertilizer should not be used.

Burlap or cotton mats are wetted thoroughly before placement on the pavement, and they are kept wet throughout the curing period. When water is in short supply, curing should have first rights to it.

If the initial and final methods of curing are not the same, wet burlap generally is the initial method. Any of the above-discussed methods may be used as the final method, as may wet earth or straw. Equipment that places and removes the curing material should be such that it does not damage the slab.

Final curing methods requiring water are not used as extensively as they were a few years ago. The greatly increased efficiency of paving operations has introduced a serious problem by lengthening the amount of pavement which must be kept wet. It is not unusual to have to supply water to cover 2 mi of 24-ft pavement or 4 mi of single-lane slab. This is for 4-day curing: 7-day curing would add about 50% to these lengths.

Following curing of the concrete and sealing of joints, the pavement can be opened to traffic when it

(Continued on page 148)

TS-360

280 hp diesel engine
15 cu yd struck capacity
20 cu yd heaped capacity
4 forward speeds to 20.0 mph
reverse to 3.1 mph

TS-200

176 hp diesel engine
10 cu yd struck capacity
13 cu yd heaped capacity
5 forward speeds to 21.8 mph
reverse to 2.5 mph

Shown above is an Allis-Chalmers Model 360 motor scraper and an HD-21 tractor.

get all these earth-moving advantages with Allis-Chalmers Motor Scrapers

Allis-Chalmers TS-360 and TS-200 motor scrapers are designed to meet the construction industry's ever-increasing demands for machines that will produce more, do today's jobs better and faster than ever before. Here are just a few of the advantages they offer for big-volume, low-cost earth moving.

More Usable Horsepower. New Allis-Chalmers diesel engines with Tornado Turbulence and follow-through combustion deliver greater torque, smoother operation, more complete burning of fuel and longer life.

Extra Traction. These motor scrapers provide greater tractive effort when loading or traveling. Two-thirds of the *empty weight* is carried on the drive wheels. *Loaded weight* is distributed equally between tractor and scraper wheels for better balance, safer hauling.

Positive Steering. Two-speed selective power steering provides safe, feather-touch response when traveling at high speeds, full maneuverability in cut or fill. Operator does not need to brake the wheels to steer; fast hydraulic action does the work for him.

Easy-Loading Bowl. Wide, low bowl design with curved bottom and offset cutting edge assures full-capacity loads in less time. Big apron opening — 102 inches on TS-360; 95 inches on TS-200 — speeds dumping of materials.

Visibility. Two-wheel tractor design increases operator vision, brings both ends of cutting edge into view. Result, more efficient loading and spreading, safer hauling.

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION
MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

One Michigan replaces two crawlers and grader . . .

Clean-up costs threatened profits until Calif. contractor bought this 2¼ yd. Michigan

Due to the nature of the job specifications, excavating contractor Kirby-Erwood Co. (Van Nuys, Cal.) faced a substantial clean-up problem in adding two outside lanes to the Foothill Freeway in southern California. Recognizing the advantages of a single machine with speed and power to keep clean-up costs from getting out of hand, they asked distributor Smith Booth Usher to demonstrate a 2¼ yd. Michigan Tractor Shovel. When they saw, they bought.

Tough specifications

To keep traffic moving, State specifications called for at least a ½-mile of wide-open, uninterrupted highway free of all construction activities any time Kirby-Erwood switched work from one side of the highway to the other. Still, it was often necessary to work alternate sides of the highway because of timing as utilities were moved.

There was excess excavation as each section was temporarily and permanently completed—broken concrete from old structures and large boulders dug up by excavating equipment. To meet the specifications under these conditions, clean-up work had to be fast and highly productive.

Michigan replaces crawlers

The 27-mph Michigan has replaced two crawler-loaders on clean-up. In many sections the Michigan does its own grading and scarifying of old bituminous shoulders, eliminates considerable grader work. The Michigan travels along a pavement at high speed, picks up boulders and cobbles which formerly had to be gathered and windrowed by a grader and loaded by the crawlers.

Fast loading by the Michigan has made the job much safer for maintenance of traffic. And in terms of economy, the Michigan operator *does the work of two crawler operators and much of the work of a grader operator.*

Breaks out concrete chunk

The Michigan operator became so enthusiastic about the power of his machine that the street Foreman tried to tame him down. He gave orders to pick up a 2-ton concrete cover from an old storm sewer catch basin . . . none of the other loaders could budge it. By hooking chain around one end of the chunk and using the hydraulic hoisting power of the Michigan, the operator easily broke it loose and carried it two miles to the dump. The back wheels didn't even come off the ground.

How to cut costs

Kirby-Erwood's Michigan does more

(Advertisement)

Heaping bucket-loads and fast loading cycles guarantee fast clean-up for Kirby-Erwood. The Michigan's low-level bucket action, power-shift transmission and 27-mph travel speed cut clean-up costs the whole length of the job.

This 2-ton chunk of concrete couldn't be moved by Kirby-Erwood's crawler-loaders. Using a length of chain, the Michigan operator easily broke it loose, loaded it and carried it 2 miles to the dump.

than help them meet job specifications: it cuts many dollars of expense from this $612,000 freeway project. As every contractor knows, bidding is extremely competitive on this kind of job; by handling clean-up work efficiently, the Michigan prevents this expense item from eating into job profits.

With Clark torque converter, power-shift transmission and planetary-wheel axles standard on all models, Michigans deliver more usable power, traction and speed than any machine of this type. If you're willing to be convinced that this machine is in a class by itself, do what Kirby-Erwood did; *ask for a demonstration.* You name the job!

Michigan is a registered trade mark of

CLARK EQUIPMENT COMPANY

Construction Machinery Division

2403 Pipestone Road
Benton Harbor 22, Michigan

CLARK® EQUIPMENT

4-wheel-drive does another job better!

TRENCHING

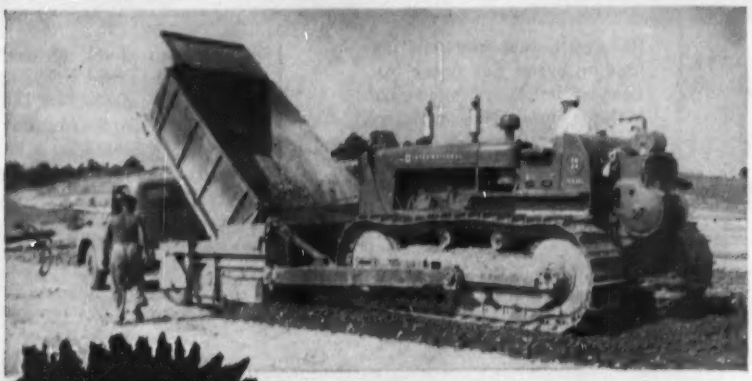
This 'Jeep'-propelled trencher digs trenches up to 6 feet deep and 14 inches wide. Mounted on the 4-wheel drive 'Jeep', it gets to the job in a hurry, and speeds up the laying of pipe, cable or drain tile. Traveling speedily to the job, the unit is ready for trenching in a matter of minutes. Greater mobility makes the 'Jeep' trencher profitable for short trenches. See your nearest Willys dealer or write for information.

4-WHEEL-DRIVE UNIVERSAL

'Jeep'®

A member of the 'Jeep' family...world's largest-selling 4-wheel-drive vehicles

WILLYS MOTORS, INC., TOLEDO 1, OHIO



Owners report up to 1000 tons per hour with a Jersey Spreader!

In conjunction with the propelling tractor, a Jersey Spreader is the FASTEST, ACCURATE PAVING Spreader in the World! . . . It is capable of spreading up to 5,000 tons of aggregate daily—easily and economically . . . It has been successfully used on such projects as: the New Jersey Turnpike, the Ohio Turnpike, the West Virginia Turnpike, the New York Thruway, the Garden State Parkway, Chrysler Tank Testing Bowl, many of the most important new airports and on large defense bases in Iceland, Newfoundland, Arabia and Africa.

Write now for complete information and illustrated literature.

MANUFACTURERS OF THE JERSEY SPREADER

JERSEY SPREADER

TRACTOR SPREADER COMPANY

HASBROUCK HEIGHTS, NEW JERSEY

REG. TRADE MARK

PAVING...

Continued from page 144

has attained sufficient strength to withstand the stresses due to imposed loads. It is usual practice not to permit traffic on the pavement until tests of beams cast at time of construction show a flexural strength of at least 500 psi. If the time of opening is determined from compressive tests made on cylinders, they should have attained a strength of at least 3,500 psi.

This and the preceding four articles have outlined methods of portland cement concrete pavement construction that have been found to result in durable, good riding roads and streets. Construction practices vary in different sections of the country, and for many operations there may be several procedures, any one of which will produce satisfactory results.

Adherence to good construction practices does not add to the cost of any project, and in many instances will result in appreciable savings over practices which do not yield as good results. It is almost axiomatic that the organization which follows good construction procedures and conscientiously complies with the intent of the specifications is an organization that operates efficiently and economically with profit to the owner and satisfaction to the client.

The tenth article in the Paving series will appear in the June issue.

COMING IN JULY!

Construction Methods and Equipment's special issue devoted to Construction Equipment Maintenance.

The theme will be "Productive Maintenance."

WATCH FOR IT!

Why Thermoid Hose Lasts Longer

Construction men everywhere find Thermoid Hose stays on the job longer—cuts replacement costs and down time. One big reason is quality construction. Another: Thermoid designs hose for specific conditions and uses. Here are three examples:

THERMINE — High pressure air hose. Oil resistant tube is reinforced by heavy duty yarn. Built on steel mandrels for high tensile strength. Smooth, abrasion resistant cover.

325 S.B. SUCTION — Heavy duty hose for water suction service. Smooth bore, wrapped hose with heavy wire reinforcement, durable duck plies.

#300 AIR HOSE — Wrapped construction, oil resistant synthetic tube and covers. Heavy duck reinforcing plies. Ideal for use in mines and quarries.

These are typical examples of how Thermoid Personalized Service meets the specific, exacting requirements of the construction industry.

Thermoid

Thermoid Company
Trenton, N. J.

Make Thermoid your choice, too for Multi-V Belts...

...and Conveyor Belting, specifically designed for the job.

Your Thermoid Distributor can help you select the Hose, Conveyor Belting, Multi-V Belts designed to lower your operating costs.

ROADS WORTH THEIR SALT...

Stā-Bilt Salt Stabilization Method Brings All-Weather Road Cost Below $400.00 a Mile

All-Weather gravel roads, vital to farm, school and suburban traffic-feeding, are being built today at a cost often less than $400.00 per mile according to recent surveys among county highway officials. And the fact that these roads often serve through many years with minimum maintenance, speaks well for modern methods of road stabilization.

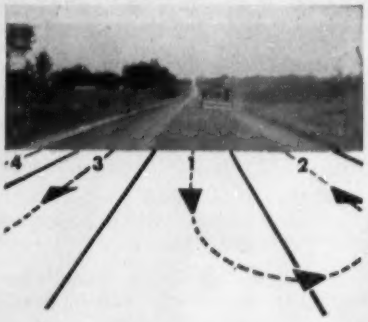
The principal means of achieving such roads is with the use of Salt, carefully and thoroughly blended and mixed with well-graded road gravel, crushed aggregate or native soils by means of a Seaman-Andwall Pulvi-Mixer. Properly constructed, such a road will last for years under heavy traffic, requiring only an occasional application of calcium chloride solution or light oil. When it is considered that former gravel roads often required eight or nine bladings a year to keep them in shape, the difference in maintenance cost is substantial.

The Seaman-Andwall "Stā-Bilt" method of salt stabilization has many advantages. It mixes the salt to complete depth of the road base, lowering the temperature at which injurious frost action will occur. The salts form a solution which so lubricates the mass as to improve its workability, resulting in better density and water-tightness, with a durable, resistant, glazed surface finish after compacting. All coarse aggregates are securely anchored against raveling, potholing, and dusting.

As its relatively low cost indicates, the Stā-Bilt salt stabilization method is comparatively simple. Stabilizing the subgrade is as important as stabilizing the surface. This should be scarified, if necessary, then brought to proper crown and grade. Then after moistening, the Seaman Pulvi-Mixer pulverizes, mixes and blends the subgrade soil to a depth of 4 to 6 inches or more. This mixing can usually be done for less than one cent a square yard, and is performed with much greater speed and uniformity than the old-fashioned method of multiple passes with a blade. For greater stability this can then be moistened and salt applied with a Century Spreader (1 or 2 pounds per square yard). This is again mixed in full depth, with the Pulvi-Mixer, and compacted with a heavy pneumatic roller.

After again moistening the subgrade, the wearing surface can be spread uniformly, shaped and graded. Then the same procedure followed as with the subgrade — spreading salt (1 to 1½ pounds per square yard) watering generously, then mixing all materials with the Seaman Pulvi-Mixer. Diagram A shows recommended routing of the mixing operation to avoid further reshaping. Usually one mixing will be sufficient if soil is well moistened.

The Seaman Pneumatic Roller is used immediately after mixing. As the surface becomes firm, enough water should be added to leave a free film on top, then rolling should be continued until water disappears, leaving a glossy surface



The final result will be a tough, durable, all-weather gravel road withstanding years of hard traffic with surprisingly little maintenance.

Two methods are currently used to add further life to Salt Stabilized roads. The first is to apply a water solution of calcium chloride two or three times yearly. The second, is application of road oil (SC-3) to the dried surface — about 1/5 gallon per square yard, repeating the application after two weeks.

As time and budget permit, many counties are adding bituminous surfaces to salt stabilized roads for greater permanence.

Spreading salt on Illinois county highway with Seaman-Andwall Century Spreader. Note uniformity of spread.

Final mixing of salt in wearing surface with Seaman Pulvi-Mixer, prior to final compaction. Notice uniformity of mix.

Finished road, Kendall Township, Illinois. Soil-stabilized for many years of traffic with minimum maintenance.

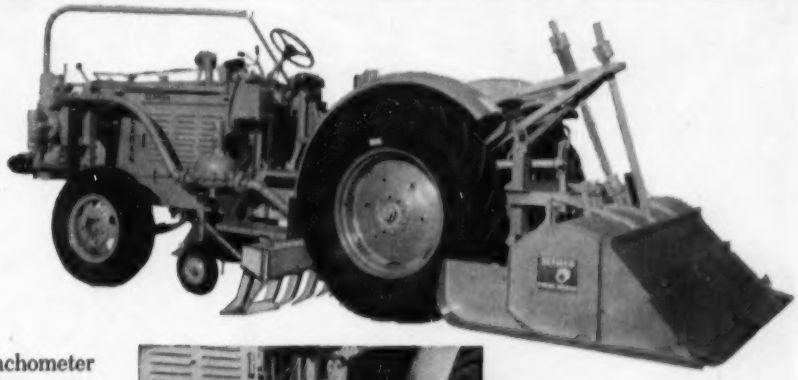
S-A
STABILIZING THE WORLD
SEAMAN-ANDWALL
CORPORATION
280 North 25th Street
Milwaukee 1, Wisconsin

Complete Stā-Bilt Equipment for Salt Stabilization

CENTURY "Posi-Feed" SPREADER

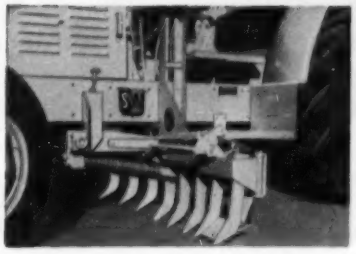
Today's leading tailgate spreader, the CENTURY "Posi-Feed" Model HY-4 is equipped with vibratory mechanism in the truck body to maintain steady movement of materials into the spreader. Spreader tray can be replaced with spinner unit for winter use in spreading sand, cinders or salt. One man operation from truck cab — requires no hand feeding.

SEAMAN TRAV-L-PLANT



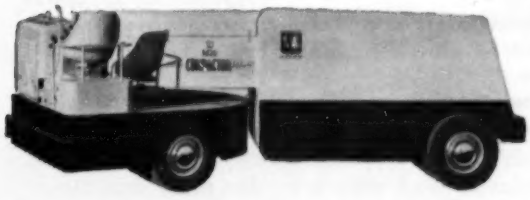
Today's stabilization "workhorse" the Seaman Trav-L-Plant does a thorough and uniform job of mixing in either new construction or reconstruction. Provides an accurate blend of coarse and fine aggregate for greater load-bearing strength in all types of roads.

Equipped with pump, spray bar, tachometer assemblies, and volumetric meter for applying water or bitumen simultaneously with in-place mixing operation. Gasoline or Diesel powered. 7-foot mixing width. Can be equipped with S-A Underbody Scarifier for light scarification.



NEW UNDERBODY SCARIFIER

Can be mounted between front and rear wheels of the Seaman PULVI-MIXER or TRAV-L-PLANT, for light scarification, frequently in the same operation with mixing and binder application. Easily attached, inexpensive.



PNEUMATIC COMPACTOR

Portable, Self-Propelled

Self-Propelled for transport road speeds up to 20 m.p.h. the S-A heavy duty, rubber-tired Compactor is of revolutionary new design. Provides new "straight down" pressure that avoids pushing action, surface shear, scuffing, material displacement. Power Steering — full 180° turn on 20-foot road beds. Four 500-gal. liquid ballast compartments for weight adjustment from 5 to 20 tons. Complete with electric brakes and lights for night transport.

Other Stā-Bilt Equipment Includes:

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Write for FREE Bulletin on Salt Stabilization. Describes advantages, latest techniques and equipment required for building long-lasting, weather-resistant roads at low cost with salt binder.

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S-A SEAMAN-ANDWALL CORPORATION

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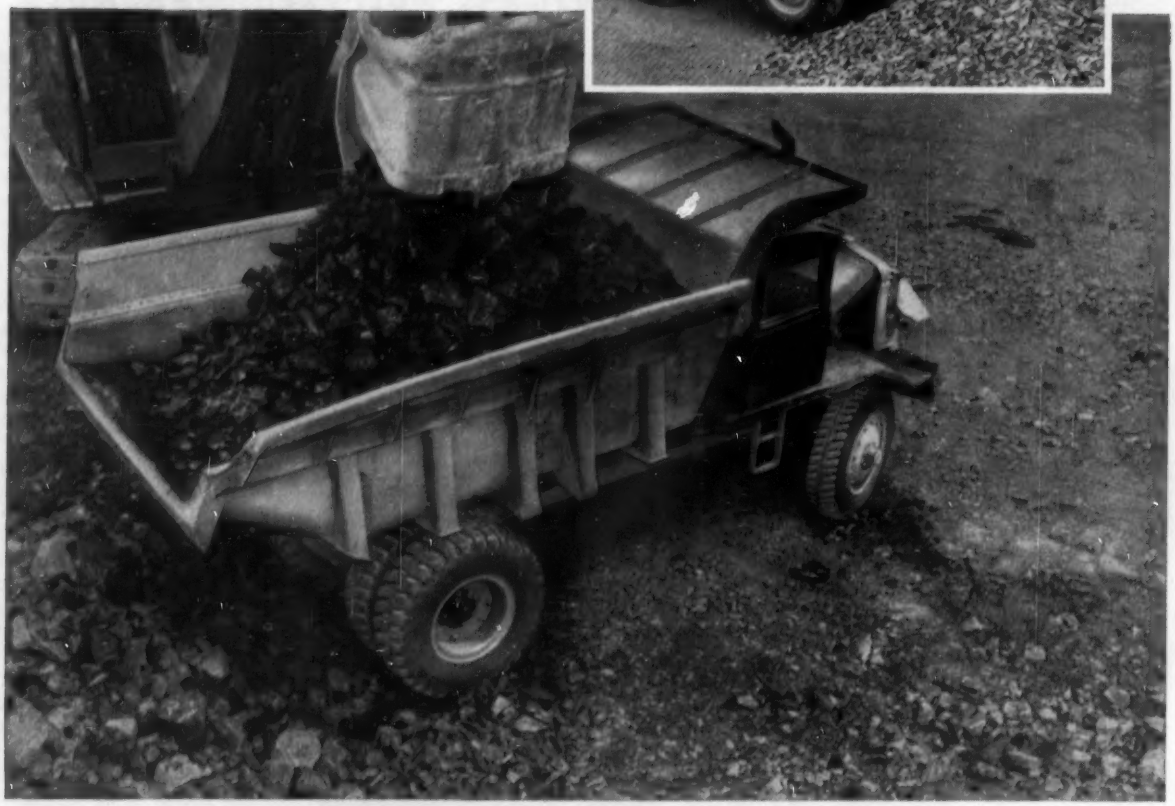
Nylon cord tires reduced off-the-road tire failures...



NOW NYLON CUTS TRUCK TIRE COSTS, TOO

FRED ALDRICH, Truck Supt. Sam Braen's Sons, Hawthorne, N. J., reports:

"Two years ago we started using nylon cord tires on our off-the-road equipment. They stood up under the roughest kind of quarry work, made tire failures rare.

"That convinced us nylon cord tires had something extra, so we put them on our trucks, too. It's paid off, because we get far fewer failures, more miles per dollar.

Forming an All-Nylon Fleet

"We're sold on nylon cords. Half of our 400 pieces of equipment are on nylon now, and we specify nylon cord tires for all replacements and new equipment."

PROVE TO YOURSELF that nylon cord truck tires give more mileage, more retreads—lowest cost per mile. Ask your dealer about nylon cord truck tires today. (Du Pont makes the tough nylon yarns, does not produce tires.)

DU PONT NYLON for TIRE CORD

DU PONT
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...THROUGH CHEMISTRY

NOW . . . IN PASSENGER-CAR TIRES, TOO . . . THE STRENGTH OF NYLON . . . FOR UTMOST SAFETY . . . SUREST PROTECTION AGAINST TIRE TROUBLE

A MESSAGE TO AMERICAN INDUSTRY • FIRST OF A SPECIAL SERIES

THE SHORTAGE OF SCIENTISTS AND ENGINEERS: *How Critical Is It?*

The United States is running into a serious shortage of scientists and engineers. There is no novelty in this observation. It has often been made in the last few years. And there has been mounting alarm about what this shortage may mean for both our national security and our prosperity.

There would be great novelty, however, if general agreement were attained on such important matters as the size of the shortage, the extent of the damage it threatens to inflict, and the best ways to eliminate it. The purpose of these editorials is not to provide this novelty, but to ventilate some of the key aspects of the shortage of scientists and engineers.

This first editorial in the series is designed to throw light on the over-all dimensions of the shortage. Others will be addressed to such questions as:

- How serious is the threat to our economic well-being and to our national security?
- What needs to be done to prevent the shortage from becoming critical?

Rise in Technical Manpower Has Been Rapid

The problem is *not* that we have been producing a small number of engineers and scientists. Indeed, the number has risen sharply. We now have a working force of more than 600,000 engineers, over twice as many as the 286,000 there were in 1940. And we have about 250,000 scientists (chemists, physicists, biologists, geologists, mathematicians, etc.), compared to only 92,000 in 1940. About one in 148 persons in the labor force of 1940 was a scientist or engineer; today the ratio is about one in every 80.

In research and development work, where highly creative scientific minds are required, there has been fully as rapid a rise in employment of scientists and engineers. Fewer than 90,000 were employed in research and development fifteen years ago; the total now exceeds 200,000.

. . . But Not Rapid Enough

Despite this rapid increase in the number of scientists and engineers—at a rate much faster than the increase in the labor force as a whole—the needs of industry, government and education for technically trained people have risen even more sharply.

The principal reason for this mounting demand is the prodigious growth of research in the last 15 years. From a total of only about $900 million spent on all types of research in 1941, the annual expenditure rose to over $5 billion by 1953 (the latest estimate available). Over two-thirds of the research is done by private industry, mostly to develop new and better products and to find new and better methods of production. Most of the rest is performed by the government, largely to develop improved and inevitably more complex scientific weapons.

One aircraft company has found from its own experience that it required 17,000 engineering manhours to develop a typical fighter plane in 1940. The requirement is now about 1.4 million engineering manhours. Development of the typical fighter plane of 1960 will require well over 2 million engineering manhours.

In this dramatic example, the need for engineering services for a basic piece of military equipment soared 80 times in 15 years. It is an indication

of why the demand for more and more technically trained men and women has outstripped even the imposing increase in scientific and engineering manpower of the last decade and a half.

Size of the Shortage

Exactly how great the gap is between the available supply of scientists and engineers and the number required, it is impossible to say. In some instances technical talent undoubtedly could be better used than it is now. And part of the shortage might "disappear" if higher salaries had to be paid. (These questions will be discussed in later editorials.) But informed estimates of the approximate size of the gap can be given.

● According to the best available information, from estimates by the Engineers' Joint Council and the U. S. Bureau of Labor Statistics, **the minimum need for engineers from graduating classes is 40,000 each year for the next ten years.** Last year we graduated only 23,000 engineers, just about enough to cover replacement needs without allowing for any expansion of the number of active engineers. Projections made by the U. S. Office of Education indicate that we shall probably not have a class of 40,000 – the *current* annual requirement – until 1963.

● According to Dr. Howard Meyerhoff, executive director of the Scientific Manpower Commission, **there is now a shortage of about 20,000 scientists.** Last year the number of doctoral degrees in the natural sciences, almost a prerequisite for research work, was only 5,000. Dr. Meyerhoff estimates that the shortage of scientists will rise another 30,000 by 1960.

More Needed as Teachers

Not all of the graduates with scientific and engineering training, furthermore, will work as scientists and engineers – that is, by performing research and giving it practical application. Such training is now necessary in many sales and management positions. And more of our technically trained men and women must remain in educational institutions as teachers if the quality of engineering and scientific education is to be maintained. A survey in 1954-55 by the National Education Association showed that, out of 277 universities, state colleges and large private colleges, nearly one-third *already* had unfilled vacancies in engineering and three-fourths had vacancies in physical sciences.

The dimensions of the shortage of scientists and engineers can be summarized as follows: **Despite a substantial rise in the trained manpower available, the needs of industry, the government and education have risen still faster. The best information indicates that, on the basis of current and anticipated needs, our recent yearly rates of production of slightly over 20,000 engineers and about 5,000 PhD's in natural sciences could be doubled without closing the gap entirely.**

The disturbing implications of this shortage for our national security and our prosperity and some practical suggestions for eliminating it will be the subjects of subsequent editorials in this series.

This is one of a series of editorials prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nationwide developments of particular concern to the business and professional community served by our industrial and technical publications.

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Donald C. McGraw

PRESIDENT

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cut maintenance time to the bone!

Alemite Portable Service Stations take all the advantages of power lubrication right to machines on the job—no time spent in travel to and from a grease shop—cut maintenance and downtime to the bone. Even more important, they assure the protection only *power lubrication* can give, greatly reduce the chances of costly bearing failure.

And you get all this tailored to your exact lubrication needs—all from standard Alemite equipment. Nothing is specially built. An Alemite Portable Service Station soon pays its own way by proven savings in time, money, equipment! Mail coupon for FREE booklet.

Alemite Portable Service Stations offer these four services

- Fast, easy lubrication of track rolls and fittings.
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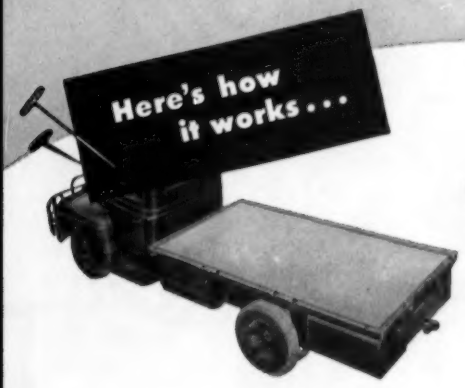
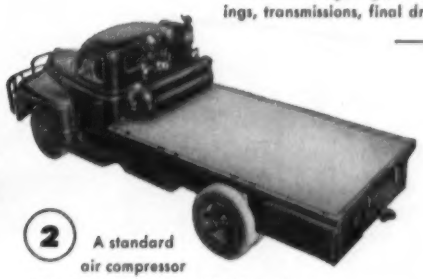
- Air line equipment for tire inflating, air cleaning.

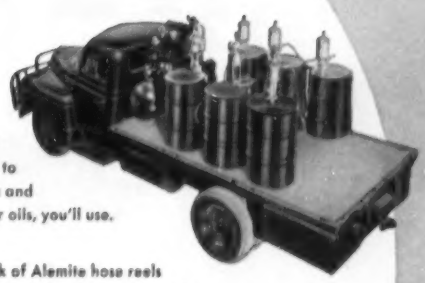
Here's how it works...





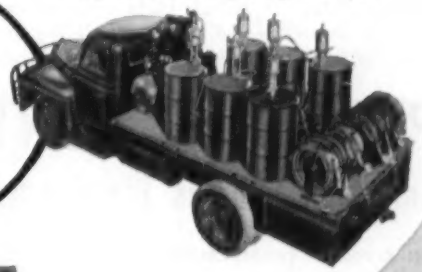
(2) A standard air compressor is installed—usually behind the cab.

(1) You choose the truck that fits your needs for size, power, terrain.

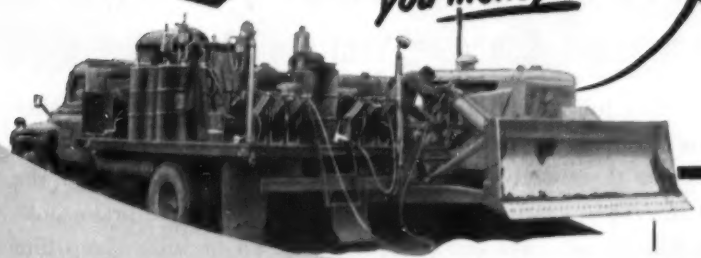


(3) Alemite Barrel Pumps are added to handle pressure gun and gear lubricants, motor oils, you'll use.

(4) A bank of Alemite hose reels are added. They reach out in a 40' working radius to service your rigs on the job.



...and your Alemite Portable Service Station is ready to roll... *ready to save you money!*



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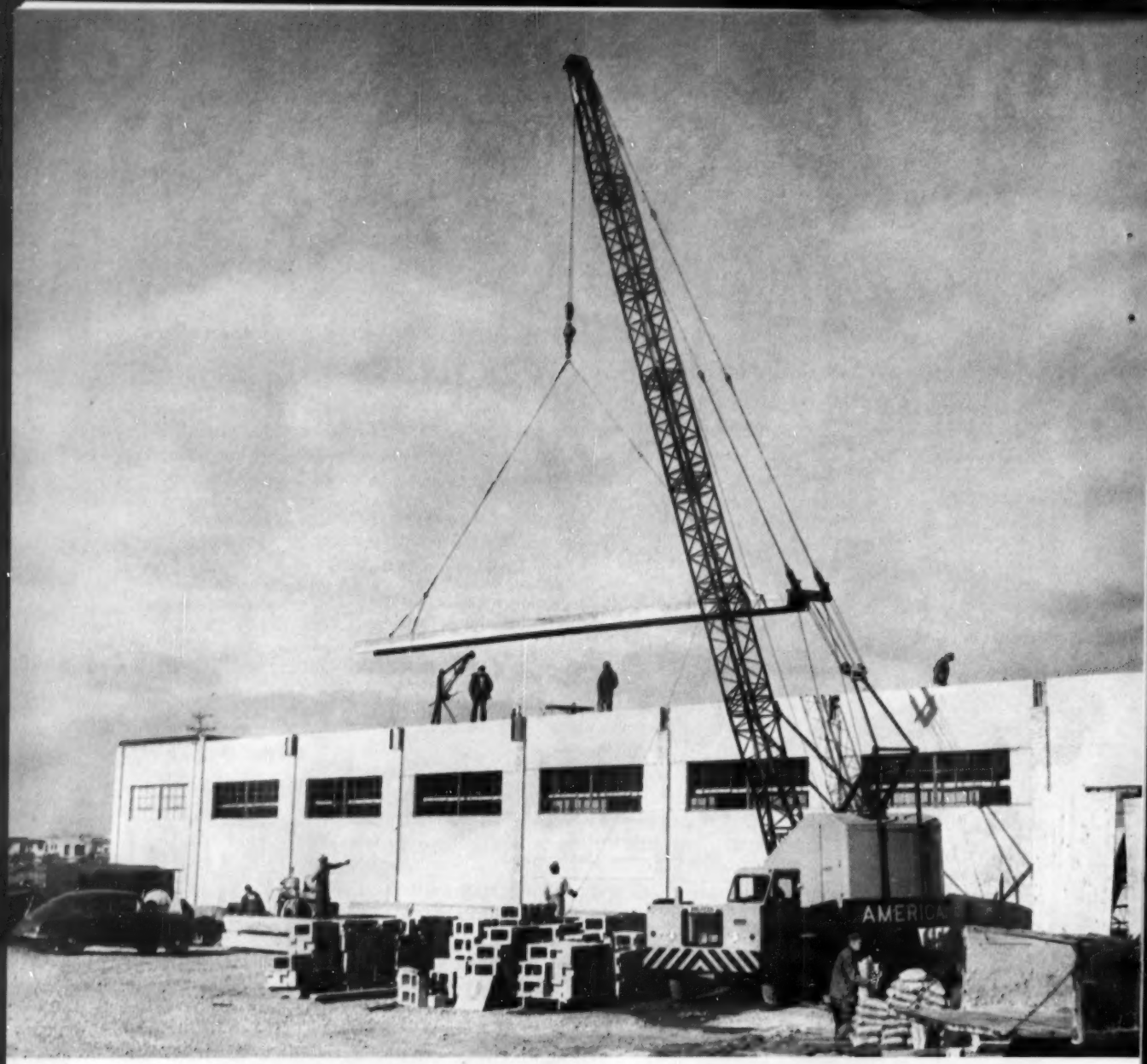


SEVEN AND A HALF-TON roof slab swings up, over an all-prestressed concrete building under construction. The American 300 Series Truck Crane used on this job was equipped with an 80-foot boom. During the slab setting operation, the machine worked at a 40-foot radius with perfect stability!

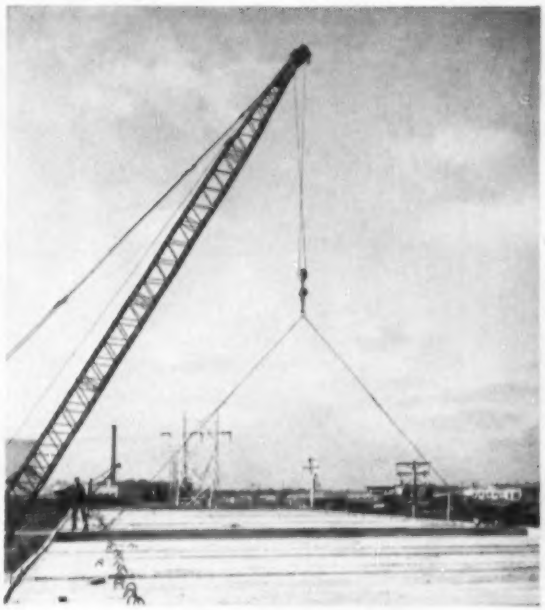
PRECISION CONTROL PROTECTS FORMS

American Handles Big Prestressed Concrete Sections Without a Slip!

On a recent prestressed concrete building job, an American 300 Series Truck Crane was used to strip heavy concrete sections from their molds. One slip might have ruined the expensive forms and machinery. The American was also used to set the beams and slabs in position. Again, precise control and smooth power was important when swinging the long, 7½-ton prestressed concrete roof slabs up into place!

Highly mobile American Truck Cranes offer perfect control like this because the clutches give the operator a "feel-of-the-load" all the time. Anti-friction bearings in the brake linkage cut operator effort up to 50%—keep him "accurate" all day! See your American Distributor for the complete story on American Truck and Crawler Cranes—they start at 12½-tons capacity on rubber, ½-yard on crawlers!

A PRESTRESSED ROOF SLAB slips into position—accurately spotted with American's perfect control. The sections had to be handled carefully to avoid chipping corners of supporting prestressed beams as well as the slabs themselves!



DIGGING FOOTING TRENCHES for prestressed structures is just one application of American's versatile, surprisingly low cost 100 Series! This dependable ½-yard machine is easy to transport—ideal for small jobs, tough enough for the big jobs. On crawlers or rubber it takes any front!

PRESTRESSED CONCRETE BEAMS can get really big—like this one being lowered into position on a dam project. It takes big American Revolver Cranes to handle such massive beams. American's unbeatable experience in designing and manufacturing cranes of every size for every job goes back three-quarters of a century!

FOR YEARS American has been the undisputed leader in the big crane field! Because of this vast design and manufacturing experience, American produces the most dependable, versatile and efficient truck and crawler cranes in the world! Today, American offers its customers a complete crane line with capacities and fronts for every job!

AMERICAN HOIST

& Derrick Company

St. Paul 1, Minnesota

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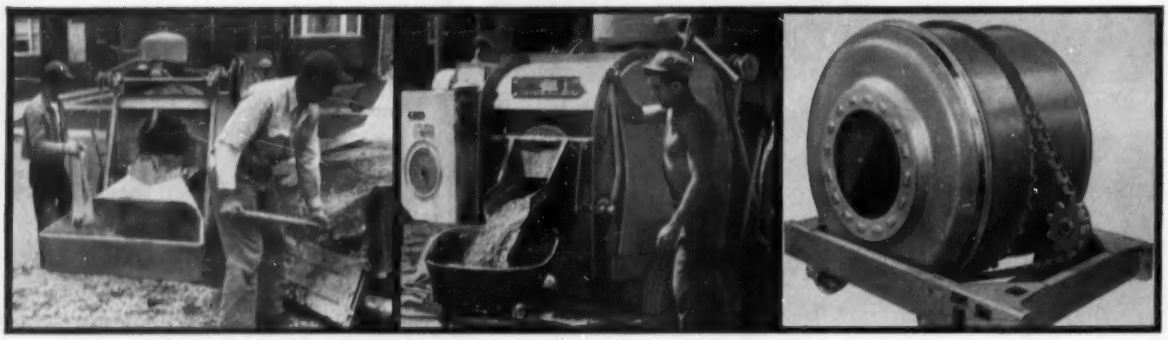
MIXERS...have the 3 Big Profit Features



Faster, Easier Charging with deep, wide, streamlined skip. It's loaded and hoisted *fast*... patented "Shimmy Skip" drops the batch into the drum *fast*. And comes down fast, too... ready for another batch.

Faster, Easier Discharge with the "swing chute." Steep incline, rounded to take full advantage of large drum opening, gets batch out *fast*. "Easy Arc" controls speed operation... cut operator fatigue!

Low Operating and maintenance costs. Only Rex Mixers have correct basic design... eliminate dead weight... put *extra* strength where strength belongs. Lightweight, rugged construction cuts your costs.

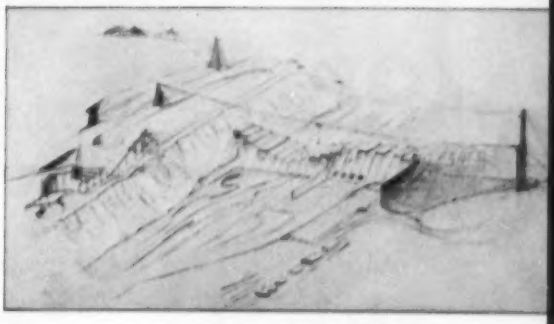
...and with Rex you get highest quality concrete

See your local Rex Distributor or write to Chain Belt Company, 4664 West Greenfield Avenue, Milwaukee 1, Wisconsin.

CONSTRUCTION REX MACHINERY

CHAIN BELT COMPANY

PROCESSING PLANT perched on high bluff overlooking dam (beyond) turns out 375 tph of top-grade sand and stone to keep pace with fast concrete placing rate of 15,000 yd per week. Crushed rock produced at quarry is carried to plant on 6,000-ft conveyor.



Big Plant Keeps Aggregate Flowing To Concrete Batchers

This is the second of two articles covering the construction of Table Rock Dam in Missouri. The first article discussed concrete placing and formwork, and this article illustrates quarrying, aggregate processing, batching, and refrigerating.

By ALBERT C. SMITH Associate Editor

WHAT DOES IT TAKE to produce 15,000 yd of concrete every week—when your main source of aggregates is a mountain of solid rock?

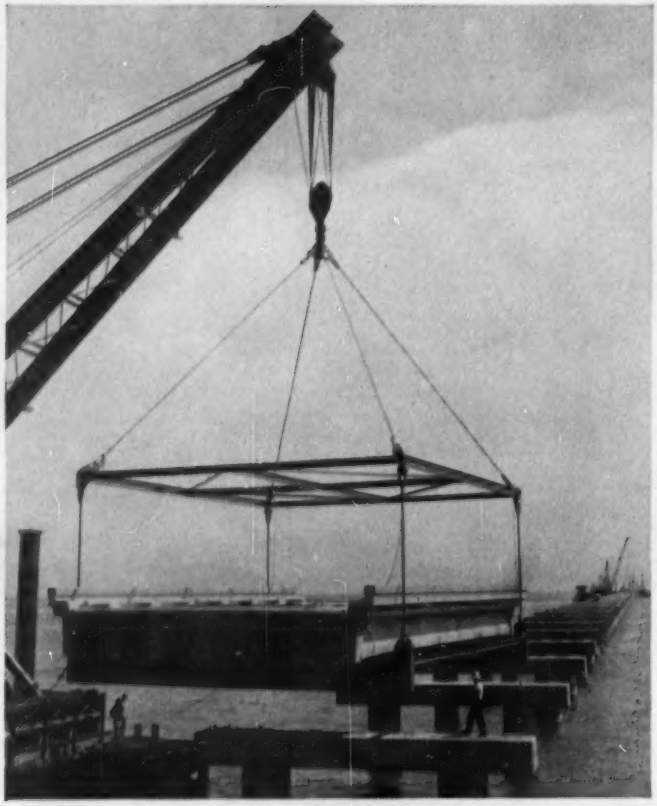
That's the question Morrison-Knudsen engineers delved into at Table Rock Dam in Missouri. Baird Mountain's limestone would supply every type of aggregate for the dam's 1¼ million yd of concrete. But it was more than a mile away, and the rock needed extensive processing. Batching, too, pre-

(Continued on page 164)

PRESTRESSED CONCRETE

Pretensioned with 3,700 tons of Union

Lake Ponchartrain high-lights



It's pushing across open water at a record pace of ½-mile a week. It's the world's longest vehicular bridge. And it's also the world's most impressive example of the advantages of prestressed concrete construction pretensioned with Union TUFWIRE strands.

The concrete slabs are 56 feet long and 33 feet wide, precast complete with curb and gutter. This giant unit size is made possible by prestressing with 175 separate TUFWIRE strands. The slabs (see photo at left) are swung into place atop hollow, cylindrical prestressed piles 54 inches in diameter.

Requirements for the causeway were: low initial costs and maintenance; high degree of strength and permanence; extremely fast construction to minimize delaying action of frequent squalls, fog and rough water. *Prestressed concrete was the answer.*

And this most vital requirement: dependable, adequate, on-schedule supply of the steel tendons that reinforce the concrete. *Union TUFWIRE strands was the answer.*

union

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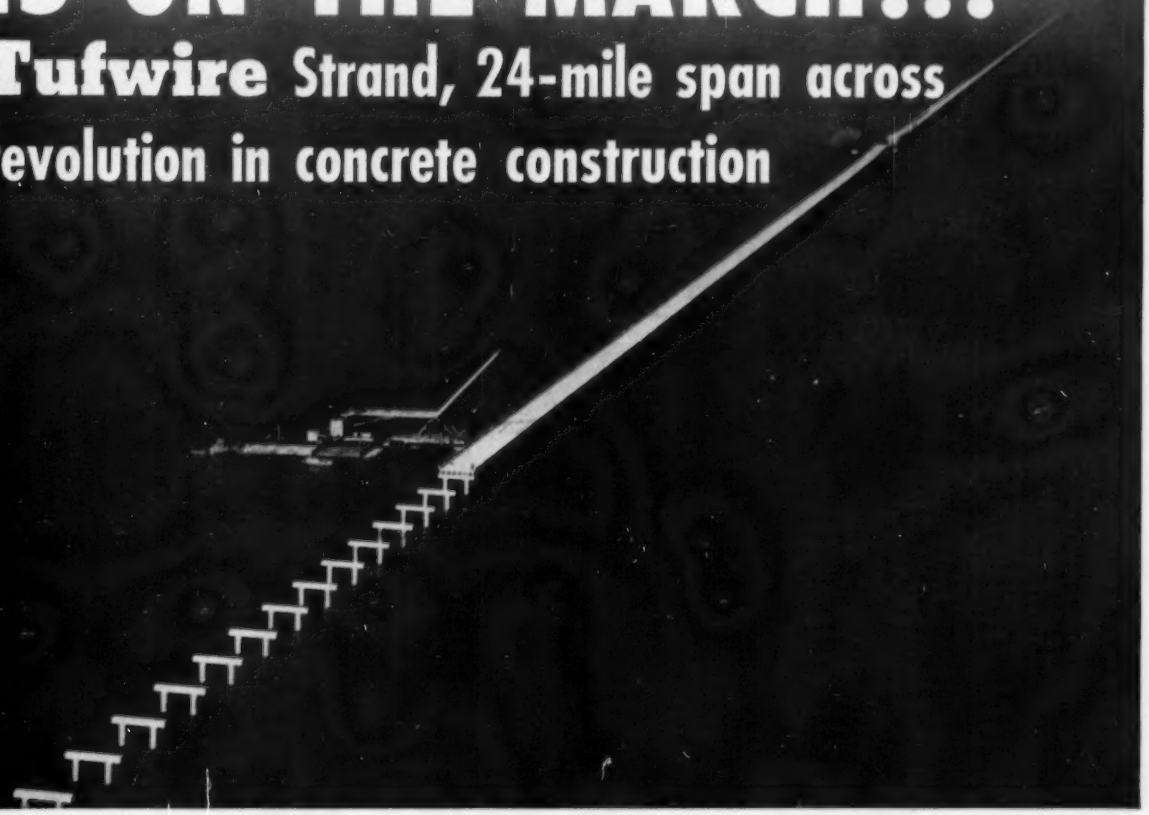
Available in Reels or Coils

IS ON THE MARCH...

Tufwire Strand, 24-mile span across revolution in concrete construction

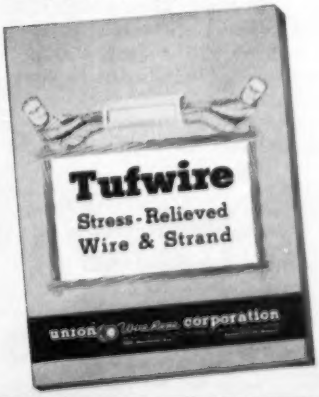


FROM AIRPORTS TO ZOOS

...use of Tufwire Strand and Wire—prestressed concrete advances in seven-league strides

Get This Booklet Now

It's a comprehensive handbook that gives you important facts about prestressed concrete, and complete specifications and data on TUFWIRE as used in both pretensioned and post-tensioned prestressing.



Prestressed concrete is finding a wide range of uses in buildings, bridges, and highways. A look at the "small item" end of the list turns up such products as movable curbs for parking areas, light poles and sign standards, fence posts and many another. Prestressed concrete's field of uses is as unlimited as the imagination of engineers and businessmen!

Union Wire Rope Corporation takes in stride an order for more than 3,700 tons of TUFWIRE strand for prestressing the longest highway bridge in the world—and at the same time appreciates and promptly supplies the smallest orders and newest customers.

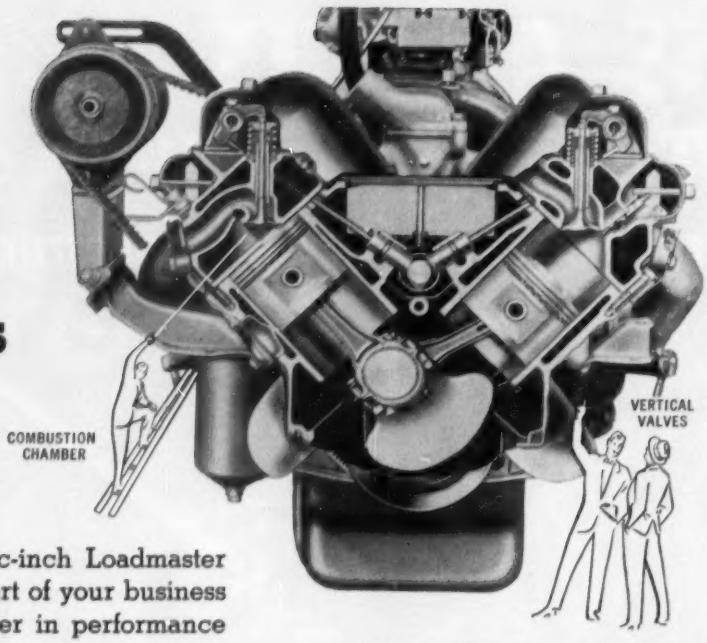
At your service is the Union Wire Rope Corporation Engineering department and research laboratory. Let us help you explore the advantages of prestressed concrete in your operation, and give you a lift with any prestressing problem.

union Wire Rope corporation

Specialists in high carbon wire, wire rope, braided wire fabric, stress relieved wire and strand.

2270 Manchester Avenue, Kansas City 26, Missouri

Take a look inside the truck industry's newest V8!

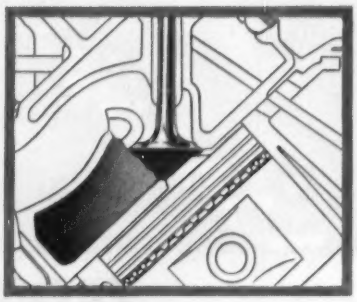


It's Chevrolet's new 322-cubic-inch Loadmaster V8 . . . and if big trucks are part of your business you'll find it has plenty to offer in performance and economy!

What you see inside that new V8 is *modern* engine design at its best! The new Loadmaster is a true heavy-duty load puller, with 310 ft. lbs. of torque and a fuel-saving compression ratio of 7.7 to 1. Extra-rugged components work together with perfected precision to produce 195 h.p.—plenty of reserve power to ease your toughest pulls!

Evidence of great engineering is everywhere in this most powerful of all Chevy truck engines. It offers the *shortest stroke* of any engine in its class; thus, engine wear is minimized, good economy assured. And it's the most compact of big-truck engines—delivers highest horsepower per pound. That's proof of *more efficient* design. Spark plugs are mounted centrally in the inverted "V" combustion chamber to give maximum heavy-duty power on regular fuel. Advanced features such as hydraulic valve lifters, chrome-plated top ring, and full-flow oil filter mean longer engine life with less maintenance expense!

And there are many, *many* such reasons why you'll do better with this new load-pulling champ under the hood! For all the facts, see your Chevrolet dealer. . . . Chevrolet Division of General Motors, Detroit 2, Mich.



Vertically mounted valves give high fuel-air turbulence during the compression stroke . . . you get maximum power from every drop of fuel!

Feature after feature proves why these big new Chevies are the work champs of the heavyweight class! New triple-torque tandem axle option lifts G.V.W.'s to 32,000 lbs. . . . G.C.W.'s to 50,000 lbs.! New frame is 25 percent heavier to stand up to your *tough* jobs. Easy, safe hauling stems from modern Ball-Race steering with bigger, stronger steering assembly. Exclusive new Powermatic transmission saves work, reduces truck wear like nothing else. No other trucks give you *so much*.

CHEVROLET

New Chevrolet Task·Force Trucks

Anything less is an old-fashioned truck!

THERE'S AN

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INSLEY TYPE WB DRAGLINE

Recognized as standard equipment by highway contractors for excavating and trenching—Insley's proven design characteristics give the contractor a dependable machine—simple to service, easy to maintain. Insley's rugged dependability means minimum down-time and more production hours.

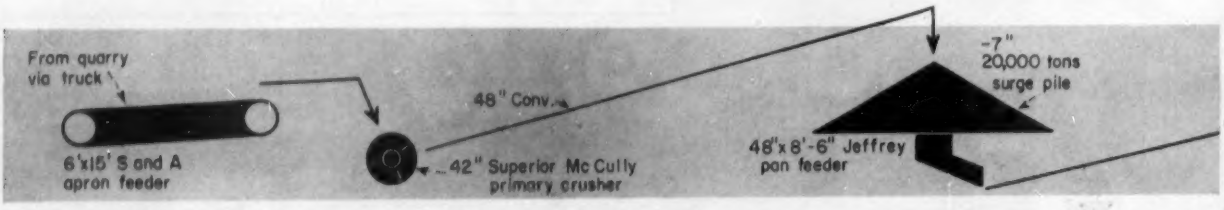
INSLEY MANUFACTURING CORP. · INDIANAPOLIS, IND.

***Wholly owned subsidiary* / THE MAXI CORP. · LOS ANGELES**

Rock is blasted, crushed, and conveyed to plant

DRILLING—Joy Challenger and Ingersoll-Rand compressor mounted on Euclid truck put down 4-in. dia blast holes at quarry.

LOADING—Euclid truck loaded by Bucyrus-Erie 3-yd shovel hauls blasted rock short distance to primary crusher. Working two 10-hr shifts, crews blast 3,500 yd a day. One of chief reasons for high production is good maneuverability of Euclid-mounted drill.



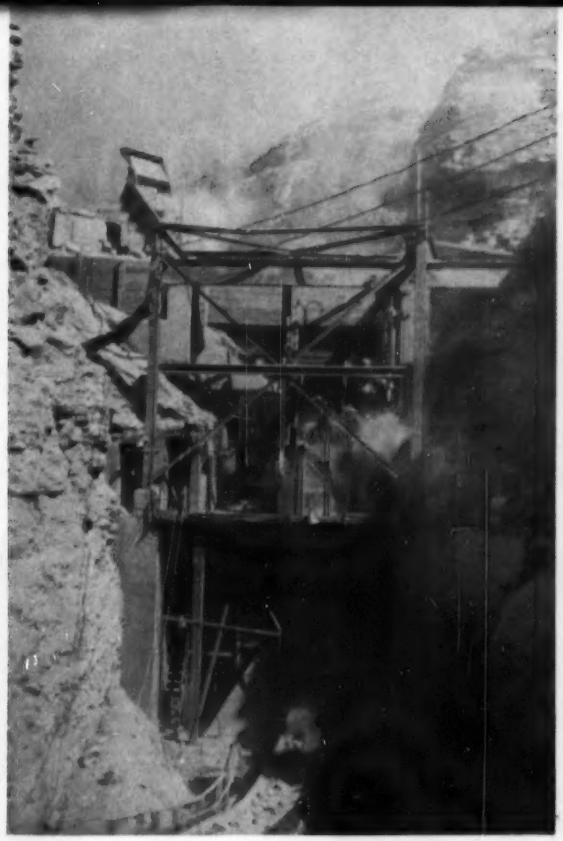
STOCKPILING—Inclined conveyor 250 ft long carries rock from primary crusher to 20,000-ton surge pile. Reclaiming tunnel underneath is made of timber cribbing. Wind helps remove dust. Big job is located in the heart of the Ozark Mountains in Missouri.

sented problems; a plant had to operate efficiently in temperatures ranging from zero to 100 deg.

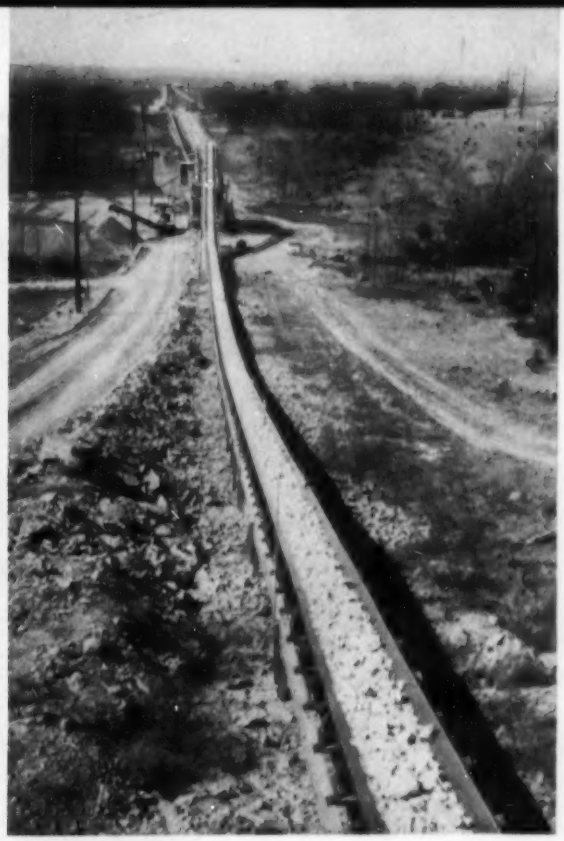
But problems like these are made to order for M-K's dam experts. They know what it takes to pour out top-grade aggregate. And they know how to make cool concrete, regardless of weather, and keep it flowing to the cableways.

Most of Table Rock's elaborate plant is perched on the top of a high bluff overlooking the dam. It is fed by a 6,000-ft conveyor that stretches back to the quarry. Here, a Joy Challenger, mounted on a Euclid truck, drills 4-in. dia blast holes 40 ft deep. It takes only an hour to drill a hole. They are spaced 12 and 24 ft apart, and about 30 are drilled for each shot.

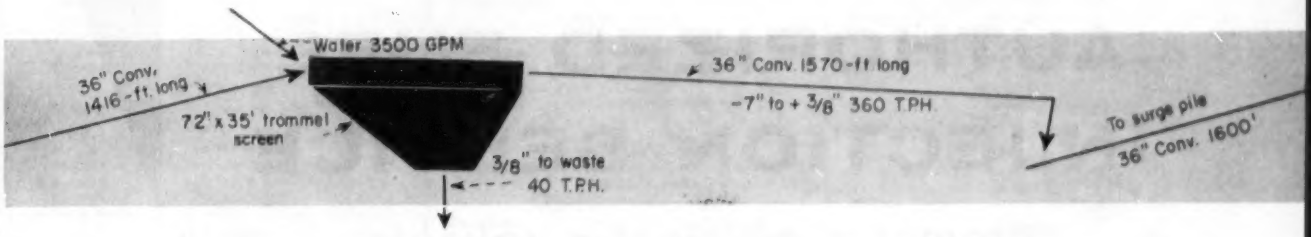
Working two 10-hr shifts, crews blast 3,500 yd a day, producing a dynamite factor of less than ½ lb per cu yd. Carbide-tipped bits are



CRUSHING—Truck dumps blasted rock into hopper which feeds 42-in. primary crusher rated at 400 tph. Notched into side of quarry, big unit crushes rock into 7-in. minus material.



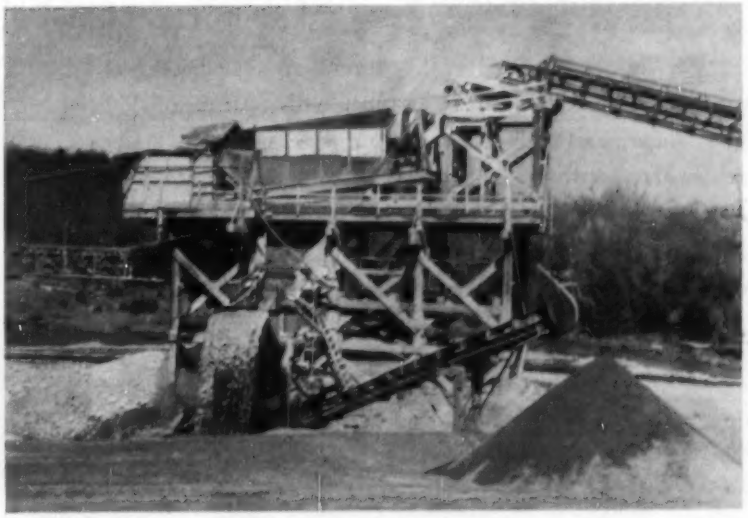
CONVEYING—Mile-long Conveyco 36-in. conveyor carries crushings from quarry to processing plant. Belt is powered both by motorized head pulleys and conventional electric drives.



ground after each 140 ft of use and have a life of about 3,500 ft. One of the chief reasons for the high quarrying production is the Euclid-mounting for the Joy drill. On relatively flat benches, M-K finds that truck maneuverability is superior to any other type.

Blasted rock is excavated by a Bucyrus-Erie 3-yd shovel and loaded into 8-yd Euclid end-dump trucks. The Eucs haul a short distance to a hopper fitted into a groove in the side of the hill. Blasted rock dumped into the hopper is dropped to a 42-in. Superior McCully crusher. It is broken into 7-in. minus material and carried on a conveyor to a surge pile. From here, the crushings are hauled over several long lengths of 36-in. conveyors totaling nearly a mile. Power for the conveyors is provided by a combination of an electric motor-

(Continued on page 168)



WASHING—Midway in mile-long conveyor, Yuba trommel screen with scrubber washes dirt and clay from crushed rock. Huge amount of water for job's many processing systems is supplied by battery of Pomona pumps set up in contractor-made reservoir.

AUTHORIZED FUEL INJECTION SERVICE

prompt • efficient • reliable

For "original maker" quality service on your diesel fuel injection equipment—just get in touch with your nearest official American Bosch service station (see list at right). Here factory-trained experts will give you prompt, efficient service, using specially designed tools and test equipment plus genuine American Bosch replacement parts. It all adds up to fast, accurate repair work that will save you time and money and keep your diesels on the go.

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Springfield 7, Massachusetts

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AMERICAN BOSCH FUEL INJECTION SERVICE STATIONS

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Birmingham, 3	Birmingham Electric Battery Co.

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Casa Grande	Diesel-Electric Service Co.
Mesa	Perkins Diesel Service
Phoenix	Charlie C. Jones Battery & Electric Co.
Tucson	Auto Plane Electrical Service
Yuma	Yuma Automotive Electric

ARKANSAS
N. Little Rock	Womack Bros. & Taylor

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Bakersfield	Automotive Diesel & Electric Co., Inc.
El Centro	Valley Automotive & Diesel Serv. Co.
Eureka	Gustafson Diesel & Electric
Fresno	Winther Bros.
Los Angeles	Diesel Precision Company, Inc.
Los Angeles, 21	Magneto Sales & Service Co., Inc.
Oakland	Diesel Injection & Governor Serv., Inc.
Oakland	Pimental & Son
Sacramento	Diesel Pump & Injector Service
Sacramento, 6	Langner & Rifkin
Salinas	Haag Diesel & Electric
San Bernardino	Diesel Injection Service
San Diego	Electric Diesel & Equipment Co.
San Francisco, 24	McKinley Corporation of California
South Gate	Diesel Fuel Injection Lab.
Wilmington	Diesel Control Corp.

COLORADO
Denver, 3	Central Auto Electric Company

CONNECTICUT
Hartford	W. J. Connell Co. of Hartford

DISTRICT OF COLUMBIA
Washington	Diesel & Ignition Service Inc.

FLORIDA
Jacksonville	Diesel Electric Service, Inc.
Jacksonville	Patten Sales Co., Inc.
Miami	Dade Diesel Company
Miami, 36	Florida Diesel Service Co.
Orlando	Interstate Diesel Service
Tampa	Stuart Diesel Service

GEORGIA
Atlanta, 3	Auto Electric & Magneto Co.
Cairo	Grady Motors

IDAHO
Blackfoot	Auto Parts Service Co.
Boise	Magneto & Diesel Supply Co.
Lewiston	Osterman Diesel & Electric Co.
Twin Falls	Diesel Pump & Injector Service

ILLINOIS
Chicago, 16	Illinois Auto Electric Co.
Mendata	Walzer's Diesel Service
Peoria	Automotive Ignition Co.
Rock Island	Lohse Automotive Service

INDIANA
Indianapolis, 4	Gulling Auto Electric Inc.
Mentone	Smith Brothers Garage
Valparaise	Diesel Service Company

IOWA
Des Moines	Electrical Service & Sales Co.
Marshalltown	Heuer Equipment

KANSAS
Garden City	Bell Diesel Injection Service
Great Bend	Bell Engine Service
Grinnell	Grinnell Electric & Diesel Service Co.
Salina	The Motor Service Company
Wichita, 2	E. S. Cowie Electric Co.

KENTUCKY
Louisville	Diesel Injection Service
Louisville	Schaaf Auto Electric Co.
Paducah	Story Electric & Battery Co.

LOUISIANA
Baton Rouge	Womack Bros. Diesel Service
Bossier City	Vaughan Tractor & Auto Parts Co.
Morgan City	Landry's Diesel Injector Service
New Orleans	Gerhardt's Inc.
New Orleans, 13	John M. Walton, Inc.

MAINE
Portland	Eastern Diesel Service Co.
Portland, 5	Portland Tractor Co., Inc.

MARYLAND
Baltimore, 1	Parks and Hull Automotive Corp.
Baltimore	Stephen Seth & Co.

MASSACHUSETTS
Boston	Boston Fuel Injection & Engine Service
Boston, 64	W. J. Connell Company
Boston, 18	Wharf Machine & Electric Co., Inc.
Fairhaven	Hathaway Machinery Co., Inc.
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MICHIGAN
Detroit	Knorr-Maynard, Inc.
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MINNESOTA
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Minneapolis	Diesel Service Company
Minneapolis, 2	Reinhard Bros. Co., Inc.

MISSISSIPPI
Jackson	Womack Brothers

MISSOURI
Kansas City, 8	Electrical & Magneto Service Co.
St. Louis, 23	Diesel Fuel Injection Service Co.
St. Louis, 3	Electric Parts and Service Co.

MONTANA
Billings	Original Equipment, Inc.
Havre	Midwest Diesel Injection Sales & Service

NEBRASKA
McCook	Automotive Sales & Service
Omaha, 2	Carl A. Anderson, Inc.

NEW JERSEY
Newark, 2	Tire Trading Company, Inc.
Somerville	Battery & Electric Service Co.
Trenton, 9	Steinert Diesel Injection Service

NEW MEXICO
Albuquerque	Central Auto Electric Company

NEW YORK
Brooklyn	A & D Diesel Service, Inc.
Buffalo, 8	Hettrich Electric Service
Hempstead, L. I.	A & D Diesel Service, Inc.
Pelham Manor	Coretti-Gross, Inc.
Rochester	Union Carburetor & Ignition Service
Troy	Ehrlich Electric Service, Inc.
Utica	Stiefvater Electric Co., Inc.
Woodside, 77	American Bosch Div. American Bosch Arma Corp.

NORTH CAROLINA
Charlotte	Carolina Rim & Wheel Co.
Raleigh	Diesel Injection Sales & Service

NORTH DAKOTA
Fargo	Northwestern Diesel Service Co.
Minot	Diesel Service Company
Williston	Crighton Motor Co.

OHIO
Akron	Standard Motor Parts
Cincinnati	Tri-State Distributing Corp.
Cleveland, 14	The Cleveland Ignition Co.
Columbus, 15	Columbus Ignition Co.
Lisbon	Lisbon Diesel & Supply Co., Inc.
Sidney	Hoover Body & Diesel Service Co.

OKLAHOMA
Oklahoma City, 2	American Electric-Ignition Co.
Tulsa	Magneto Ignition Company

OREGON
Klamath Falls	Specialized Service Co.
Pendleton	Eds Magneto & Diesel Co.
Portland, 14	Automotive Products, Inc.
Roseburg	Diesel Injection Service

PENNSYLVANIA
Harrisburg	Penn Diesel Service Co.
Hazleton	Penn Diesel Service Co.
Mt. Carmel	Gengler's Diesel Service & Sales
Philadelphia	North American Diesel Injection Co.
Philadelphia	Sullivan Brothers
Phillipsburg	Keystone Diesel Inj. Service
Pittsburgh, 6	Automotive Ignition Co., Inc.

SOUTH CAROLINA
Charleston	Diesel Fuel Injection Service
Columbia	Boney Diesel Works Co., Inc.

SOUTH DAKOTA
Lemmon	Josund Auto Electric
Rapid City	Hoseth Auto Electric
Sioux Falls	Reinhard Brothers Company

TENNESSEE
Knoxville, 15	Diesel-Magneto Service Co.
Memphis, 4	Automotive Elec. Service Co.
Nashville	Precision Parts Corp.

TEXAS
Beaumont	Diesel Engine & Pump Co.
Dallas, 1	Beard & Stone Electric Co., Inc.
El Paso	Reynolds Batt. & Mag. Co.
Houston, 1	Beard & Stone Electric Co., Inc.
Houston	Diesel Pump & Injector Service
Houston	Magneto & Diesel Injector Service
Odessa	Electric Service & Supply
Pampa	Radcliff Bros. Elec. Co.
San Antonio	S. X. Callahan
San Antonio	Womack Bros.

UTAH
Salt Lake City	Diesel Electric Service & Supply Co.
Salt Lake City	Midwest Service & Supply Co.

VIRGINIA
Norfolk	Diesel Injection Sales and Service
Richmond	C. H. Woodward Electric Co., Inc.
Salem	Diesel Injection Sales & Service

WASHINGTON
Seattle	Seattle Injector & Electric Co.
Spokane	Spokane Diesel & Electric Co.
Spokane	Sunset Electric Co.
Walla Walla	Walla Walla Motor Supply, Inc.
Yakima	Diesel & Electric Service Co.

WEST VIRGINIA
Charleston	Mountain Service

WISCONSIN
Milwaukee, 2	Wisconsin Magneto Company

WYOMING
Casper	Cotter Battery & Electric Company
Mills	Diesel Service Company

ALASKA
Anchorage	Automotive Diesel Electric Supply & Overhaul
Juneau	Van's Diesel Service

CANADA
Calgary, Alta	Hutton's, Ltd.
Edmonton, Alta.	Smith Battery & Auto Electric
Fredericton, N.B.	Stairs Bros. Fuel Injection Service Station
London, Ont.	Universal Ignition & Battery Ltd.
Montreal, Que.	International Electric Co., Ltd.
Montreal, Que.	Northam Equipment, Ltd.
Ottawa, Ont.	Welch & Johnston, Ltd.
Peterborough, Ont.	A. C. Curtis, Ltd.
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Regina, Sask.	Electric Motor Service
St. John's (Newfoundland)	A. H. Murray & Co., Ltd.
Saskatoon, Sask.	Lambert Electric, Ltd.
Toronto, Ont.	A. Cross & Co., Ltd.
Toronto, Ont.	Auto Electric Service Co., Ltd.
Toronto, Ont.	Westway Auto Electric Ltd.
Vancouver, B. C.	Fred Holmes Fuel Inj. Sales & Service Ltd.
Vancouver, B. C.	Jeffree & Jeffree, Ltd.
Vancouver, B. C.	Vivian Diesels & Munitions, Ltd.
Winnipeg, Man.	Brown & Murray, Ltd.

HAWAII
Honolulu	Honolulu Iron Works Company
Honolulu	Kawaiahao Ltd.
Honolulu	Todoki Machine & Marine Works

PUERTO RICO
San Juan	General Farm Equipment Co.

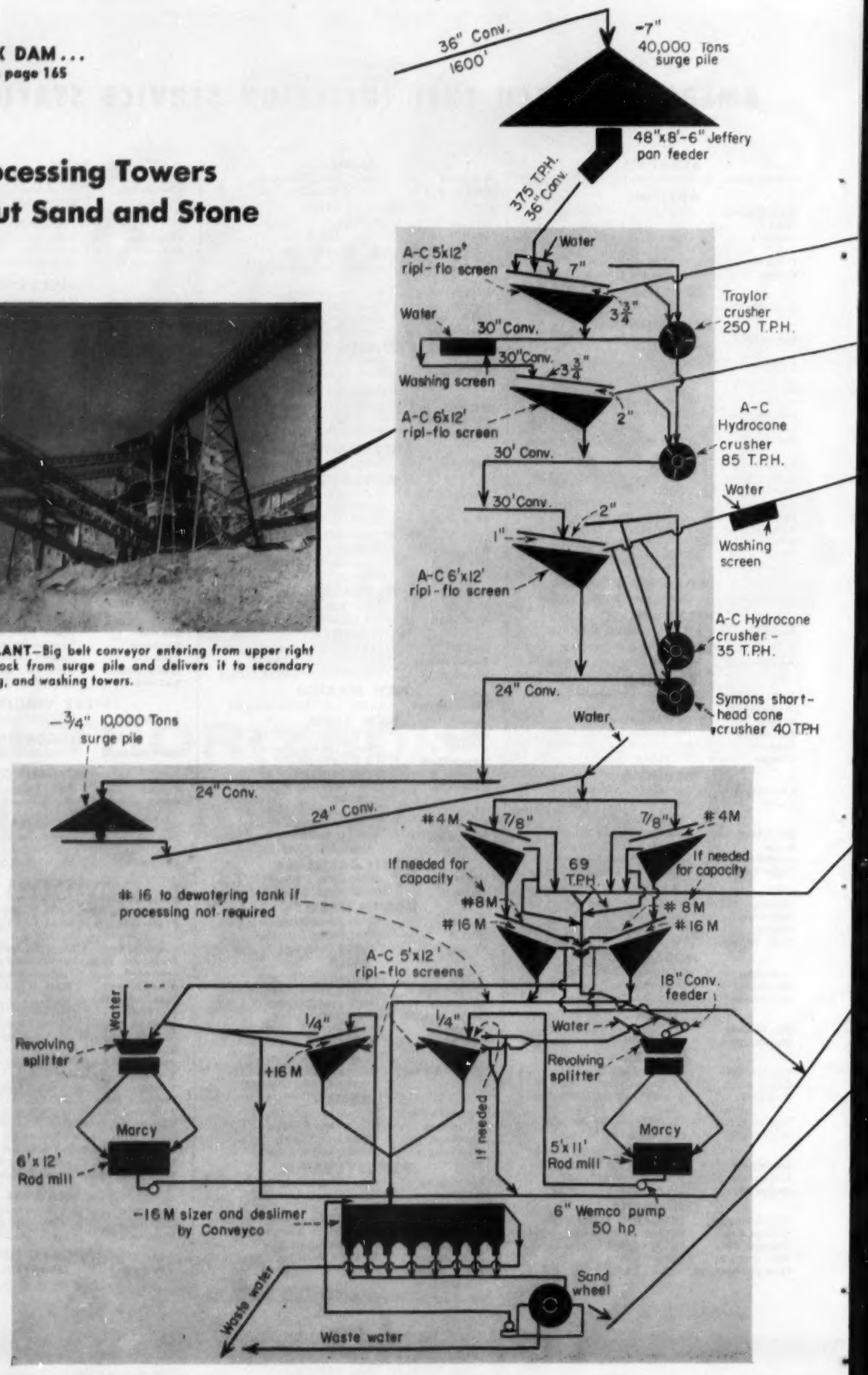
(List of foreign service stations available on request)

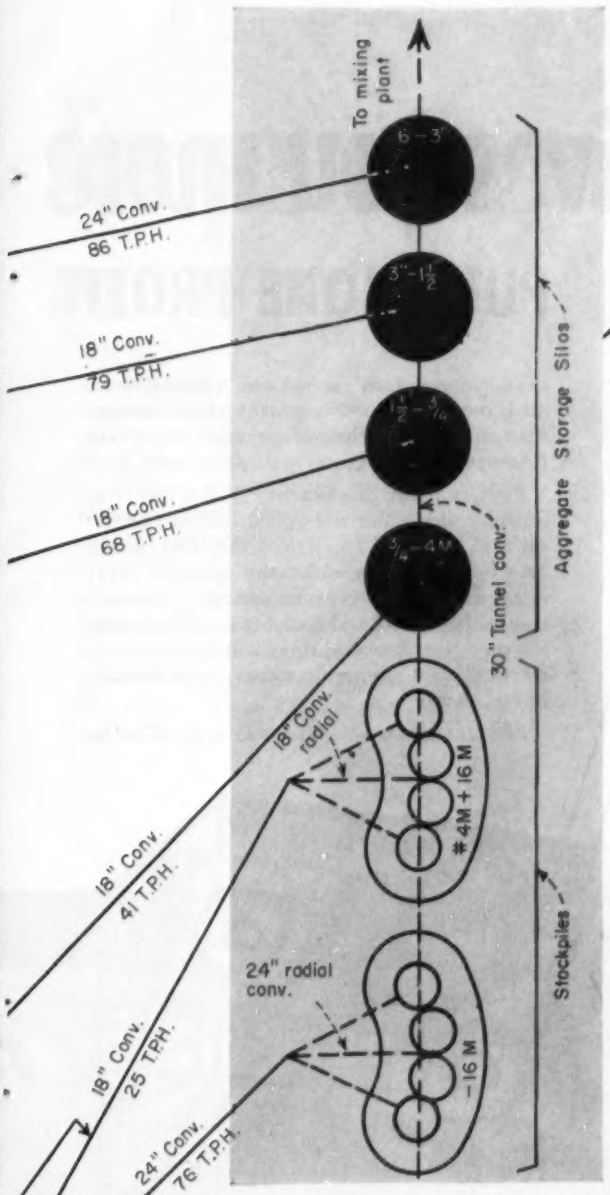
4095

TABLE ROCK DAM...
Continued from page 165

Tall Processing Towers Pour Out Sand and Stone

AGGREGATE PLANT—Big belt conveyor entering from upper right carries crushed rock from surge pile and delivers it to secondary crushing, screening, and washing towers.





STORAGE SILOS—Four Armco silos store coarse aggregate over reclaiming tunnel leading to batch plant. Refrigerated air is circulated through silos to pre-cool stones.

ized head pulley and conventional belt drives.

About midway in this long conveyor the crushings pass through a scrubber which washes out most of the unsuitable fines and clay. The material moves another 3,000 ft to a second surge pile, where a feeder in a reclaiming tunnel underneath moves it to a final conveyor which carries it to the top of a crushing and screening tower.

Four secondary crushers and an extensive system of washing screens thoroughly process the crushings. They scalp off the three largest sizes of coarse aggregate and send the rest, mostly ¾-in. minus material, to a surge pile. A 24-in. conveyor picks up this material and carries it to the sand plant. Here, No. 4 to ¾-in. aggregate is scalped off, and the remainder goes into a network of screens, washers, and rod mills which produce the two smallest sizes of fine aggregate.

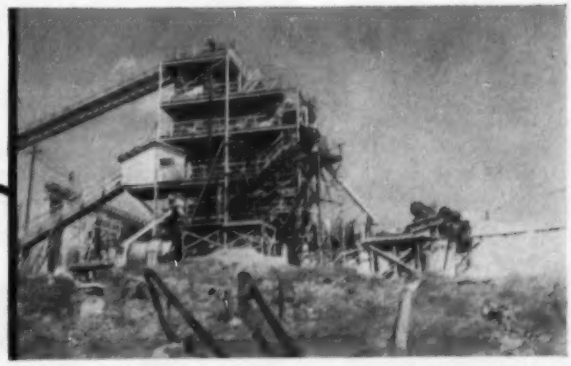
All aggregates are stored over a long reclaiming tunnel. First in line are four Armco silos holding coarse aggregate. Directly behind them are two piles of sand stocked by radial conveyors. The 840-ft tunnel conveyor transfers the aggregate to an inclined conveyor which charges bins on top of the batch plant with a swivel chute.

Batch Plant

The batch plant is a standard Johnson fully automatic type with three 4-yd tilting mixers. On one side of the plant are two 5,620-bbl cement silos; on the other side is the refrigeration plant.

In the mix, 75% portland and 25% natural cement are blended to cut heat of hydration. Both nat-

(Continued on page 172)



SAND PLANT—Minus 3/4-in. material from aggregate plant is fed to top of sand plant and processed into No. 4 to 3/4-in. coarse aggregate and two sizes of fine aggregate.

Gar Wood Buckeye

gives you more

PUTS MORE PROFIT

More for your money in excavators. Built and backed by specialists in ¾ yard machines, Gar Wood excavators give you power steering for better maneuverability . . . independent travel while swinging for faster loading cycles . . . fluid coupling that absorbs digging shocks . . . independent chain crowd that puts more engine power into every bite. And, only Gar Wood gives you a complete selection of front-end attachments, including the exclusive Foundation Borer that digs up to 26 unreinforced footings per day!

In industry, in construction and in local government, men who know equipment value have come to expect more for their money from Gar Wood-Buckeye. A comparison will show you why.

First, compare productivity . . . not just rated capacity alone, but the actual output per day on a given job. You'll find that Gar Wood-Buckeye machines make the most of every minute. Operation is faster, easier . . . operator control is positive and accurate . . . adjustments for changing job conditions and conversion to meet different job requirements can be handled in less time.

Next, check on-the-job availability. The Gar

More for your money in truck cranes. Gar Wood 75BTs give you the right combination of heavy-duty capacity and multi-job mobility for both construction and materials handling work. Live, 2-speed boom hoist with full power for lifting and lowering . . . complete and accurate control at all times . . . optional hydraulic coupling for smoothest operation . . . complete, easy convertibility. All these advantages add up to safe, economical handling of 20-ton loads.

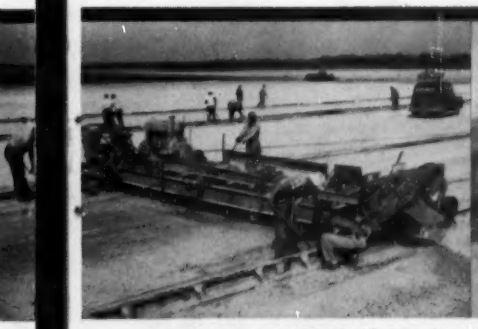
for your money-

INTO EVERY JOB!

Wood-Buckeye line is designed to stand up in rugged day-in day-out service . . . built to give you the production you need when you need it. Maintenance is easy. You'll find more anti-friction and sealed-for-life bearings . . . easier accessibility to components for periodic checks . . . unit construction for faster field servicing.

This adds up to more production per dollar invested . . . more profit from every job! Call your Gar Wood-Buckeye dealer and find out more about the way your equipment dollars work harder in this advanced line. Or, write to: Customer Service Department, Gar Wood Industries, Inc., Wayne 3, Michigan.

More for your money in wheel-type ditchers. Only Gar Wood-Buckeye gives you a live hydraulic wheel hoist for faster, more accurate positioning of digging wheel... hydraulic conveyor drive for instant adjustment to handle any volume of spoil... plus tractor-type crawlers, simplified group controls, tapered rooter bits. Such advantages as these explain why contractors make more profit on ditching contracts when they bid 'em with Buckeye!



More for your money in finegraders. Power Finegraders by Buckeye insure greater paving profits because they cut the grade faster and more accurately . . . protect you against penalties for thin slabs, save concrete dollars by eliminating slabs that are too thick. One man easily controls the Finegrader, produces up to 420 feet of a 24-foot grade per hour, and exactly to specifications. For extra profits, put a Finegrader on your next paving job.

More for your money in spreaders. Gar Wood-Buckeye surface material spreaders give you the speed you want, the accuracy you need to distribute sand, gravel, slag, salt and ashes at lowest cost. Hitching is fast, safe and automatic. Flow is accurately regulated for either uniform or tapered spread . . . from a mere sprinkle up to 2½-inch thickness. Width of spread adjustable in 6-inch steps. You get fast, positive spreading regardless of material, truck speed or direction.

More for your money in ladder-type ditchers. Only the Buckeye 407 ditcher offers push-button conveyor shift to speed work around obstructions . . . plus independent lever steering, speeds you can find and use, instant hydraulic boom control and many other features for easier operation, more production. The 407 is far easier to operate, control and adjust than any other ditcher in its class . . . big reasons why it's the world's largest selling ladder-type machine!

GAR WOOD INDUSTRIES, INC.

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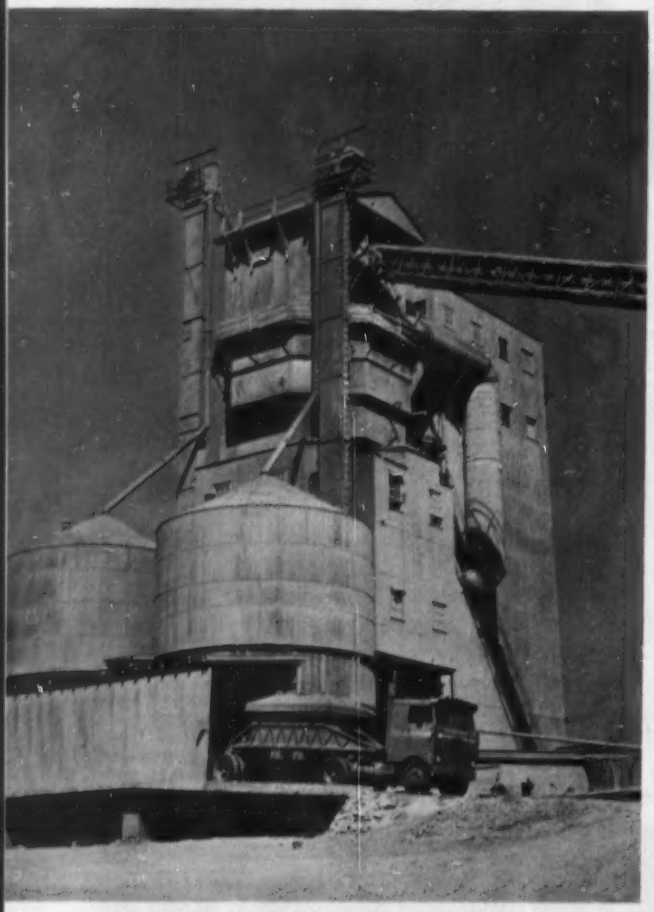
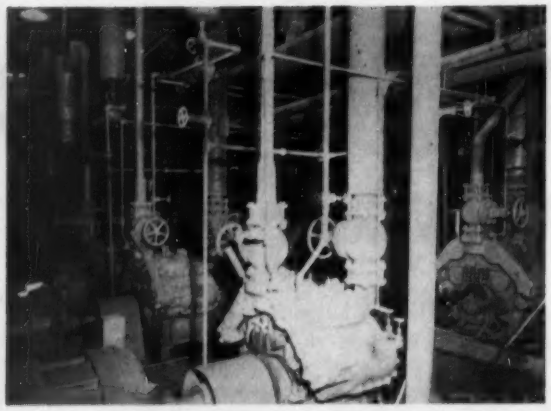
Plants in Wayne and Ypsilanti, Mich.; Findlay, Ohio; Mattoon, Ill.; Richmond, Calif.

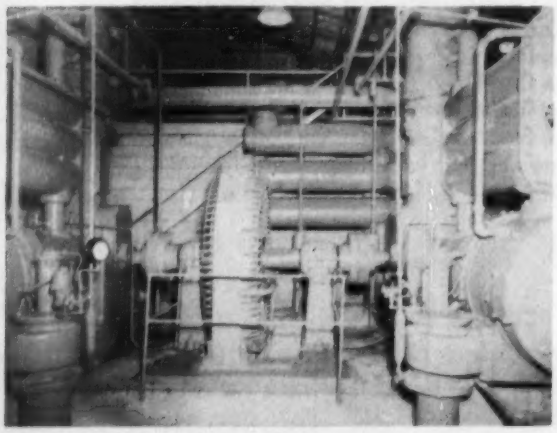
Gar Wood-St. Paul Hoists & Bodies | Gar Wood Load-Packers | Gar Wood Winches | Gar Wood Tractor Equipment | Gar Wood-St. Paul Frate-Gates | Gar Wood-Buckeye Hi-Way Wideners



AUTOMATIC Johnson batch plant is joined to huge refrigeration plant. Kenworth truck with Fruehauf trailer unload bulk cement.



BATTERY of York ammonia compressors is heart of 1,150-ton refrigerating plant. Eight banks of coils cool circulating air.



COMPRESSED AIR for much of job is piped from Joy-Sullivan 3,100-cfm compressor powered by 500-hp electric motor.

ural and portland cement are hauled in Fruehauf aluminum trailers pulled by butane-powered Kenworth trucks. Universal Atlas portland cement is brought in by rail about 8 mi from the dam. It is loaded into a 7,000-bbl silo which charges the trailers. Natural cement is hauled by trailer from Kansas.

Specifications calling for a maximum concrete temperature of 50 deg at the time of placement demand an elaborate refrigeration plant. It has a capacity of 1,150 tons of refrigeration and requires a total of 1,200 hp.

The refrigerating system incorporates these four operations:

- Cold-air pre-cooling of aggregates in storage silos.
- Cooling of aggregates in batch bins.
- Refrigerated water in the mix.
- Flake ice in the mix.

One, or a combination of these can be operated, depending on the weather.

Pre-Cooling

Except for pre-cooling in aggregate silos, the refrigerating system is conventional. The top two floors of the refrigeration building mount five York flake-ice machines with a capacity of about 100 tons a day. On the floor below, hoppers dump the flake ice into screw conveyors that feed into the mixing area of the batch plant.

The lower two floors hold eight banks of coils through which air is cooled, then blown around aggregate bins in the batch plant, and recirculated. The first floor of the building supports a huge system of ammonia compressors and accessory equipment.

The pre-cooling system at the aggregate silos operates independently of the main refrigerating plant except for chilled water which is circulated to compressors in a small plant near the silos. Air is cooled by a bank of two coils, blown through the aggregates in the four silos, and then recirculated. The pre-cooling system lowers the temperature of aggregate up to 30 deg, greatly cutting the work for the rest of the system.

Water for mixing, condensing, washing, and many other uses is handled mostly by electric deep-well turbine types. More than 20 are in constant use on the job.

Personnel

A. Campbell is project manager, C. Bolton is project engineer, and H. Maxwell is general superintendent for the contractor. Plant superintendent is J. Poynter.

For the Corps of Engineers, U. S. Army, L. Sherman is project engineer. Col. S. Brown is district engineer for the Little Rock District.

MORETRENCH WELLPOINTS DEEP DRY PUMPING STATION

in Natick, Mass.

Never underestimate a woman's common sense!

Natalie Adelman, N. J. Adelman Const. Co., knows that the best way to control 17′ of water in clayey sand is to do it with a Moretrench Wellpoint System.

Pumping started on Monday afternoon. Wednesday morning, they were excavating—

IN THE DRY

Want progress with economy on your wet work? MORETRENCH is the proven answer! Ask us for an estimate.

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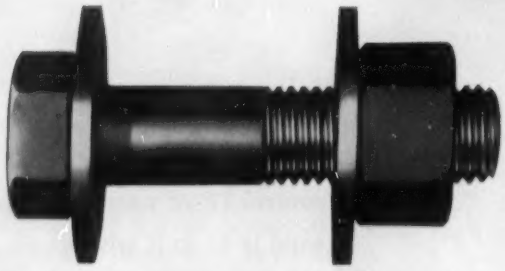
THREADED RODS. Two types, cut threads and rolled threads. Cut-thread rods are furnished plain or upset, in thread diameters up to and including 4½ in. Rods with rolled threads are produced in thread diameters up to and including 1½ in. Each type of rod can be supplied in a wide range of lengths, and with black asphaltum coating, if desired.



Fasteners

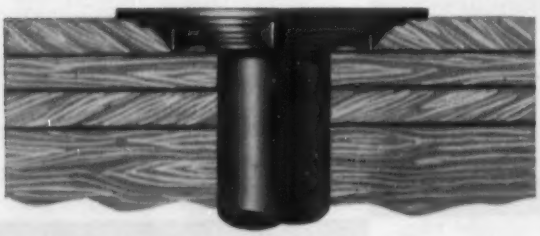
THAT GRIP FIRMLY ...AND HOLD ON

HIGH-STRENGTH BOLT. Saves erection time, as bolt can be installed cold by means of a holding wrench and pneumatic impact wrench. Bolt is made of carbon steel, and is quenched and tempered to meet requirements of ASTM Specification A-325. Used as shown, with two hardened washers. Also ideal for bridge construction, as it provides connection so tight that it effectively resists effects of vibration. Made in diameters from ½ in. to 1¼ in. Furnished in all lengths.

Here are three types of fasteners, selected at random from among the wide range of fasteners produced by Bethlehem for the construction industry. Like all Bethlehem fasteners, they can be counted on for firm grip, and dependable performance. Whether you're looking for these items, or fasteners of some other type, you can be pretty sure that we either have the style and size you want, or can make it for you quickly. Just get in touch with the nearest Bethlehem sales office about your requirements.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

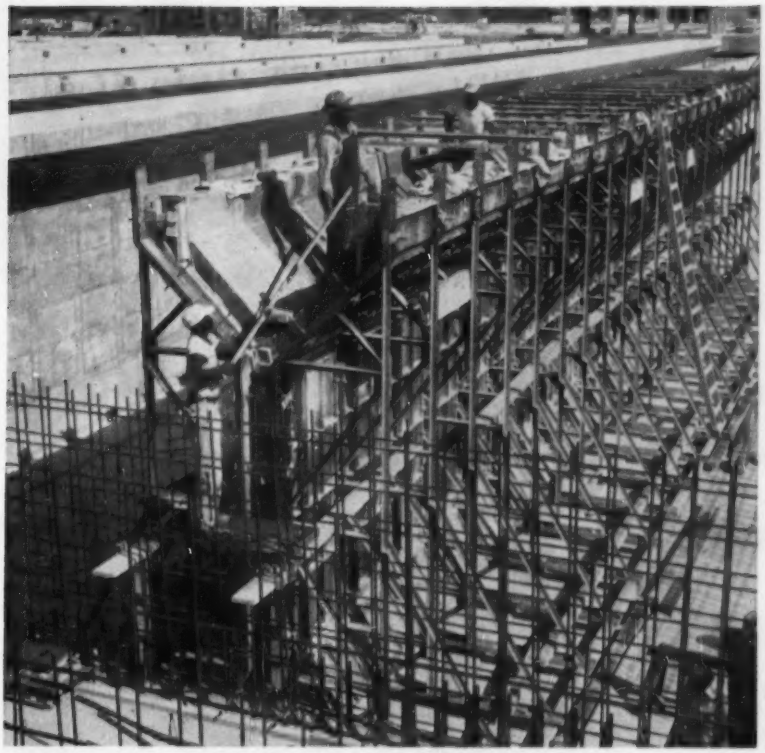


PLYWOOD BOLT. This bolt provides 50 pct more bearing surface under the head than a carriage bolt of equal size. Closely spaced spirals under the head, reversed against the threads, provide a water-tight joint, retarding dry rot. Flat head provides a flush surface which does not damage wood.

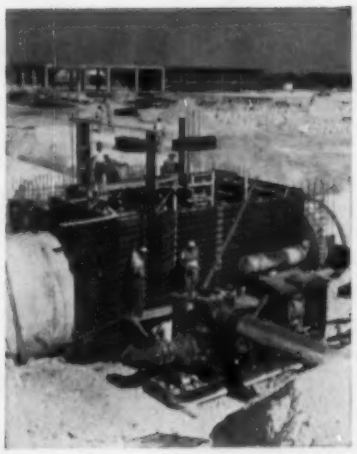
BETHLEHEM STEEL

Bethlehem Bolts Are Good Bolts

(Advertisement)



Special Y wall forming system makes for simplified stripping operation. 100% reusability of all materials. Note complete absence of lumber normally required for shoring and bracing on this type of structure.



Intricate forming in restricted areas presented no problem. Uni-Form Panels erected aligned and braced one side eliminated difficulties normally encountered in placement of reinforcing steel. Note Uni-Form Panels around large precast pipe.

One side aligning and bracing provides clear unobstructed working areas increasing job efficiency.

CUTS MATERIAL COSTS with Pre-Fab Form System on Sewage Plant Job

In the construction of the Miami Sewage Treatment Plant Job the Paul Smith Construction Co., of Miami, Florida chose to use the Uni-Form Panel System in the forming of one million sq. ft. of contact area. The contractor estimated that the use of the Uni-Form System *saved 40 percent in material costs alone.* In addition, faster form erection with fewer men kept the job moving ahead of schedule and reduced estimated labor costs considerably. These fine results were obtained even though this was the contractor's first experience with the Uni-Form Panel System.

This considerable savings in material and labor was realized in spite of intricate Y wall forming and pipe intersections which causes complicated forming problems with conventional forming systems.

Pre-fabricated, ready to use—completely engineered to handle most forming problems, the Uni-Form Panel System provides such advantages as simple assembly—minimum one side alignment and bracing—automatically accurate wall widths—positive internal spreading—faster stripping and maximum re-usage to give the contractor lowest all around form costs.

Y wall trusses designed to member with standard Uni-Form Panels formed a completely automatic system for handling the special forming problems, and were big factors in the economy and speed obtained on the job. Simple assembly of Standard Uni-Form Panels on the trusses eliminated many of the aligning, bracing and spreading problems usually encountered in Y wall construction. In addition to simplified forming the combination system of standard Uni-Form Panels and trusses eliminated many of the problems normally encountered in the stripping of a wall section of this type. The contractor was well pleased with all phases of his forming and stripping operations.

Why not investigate the many advantages the Uni-Form Panel System can bring to you? Write for the Uni-Form Catalog—or better yet, send us a set of plans for an estimate on your next job. Let us prove to you as we did to the Paul Smith Construction Co., that the Uni-Form Panel System can cut your forming costs.

UNIVERSAL FORM CLAMP CO.
1238 N. Kostner Avenue • Chicago 51, Illinois

Branch Offices and Warehouses:
Los Angeles • San Leandro, Calif. • Houston, Texas
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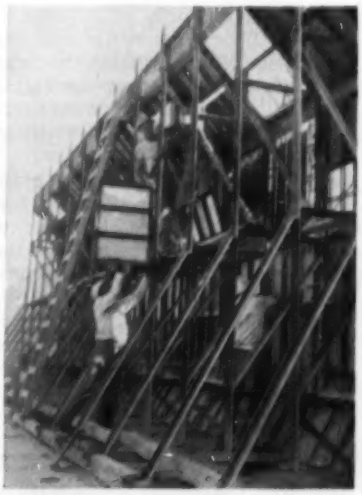
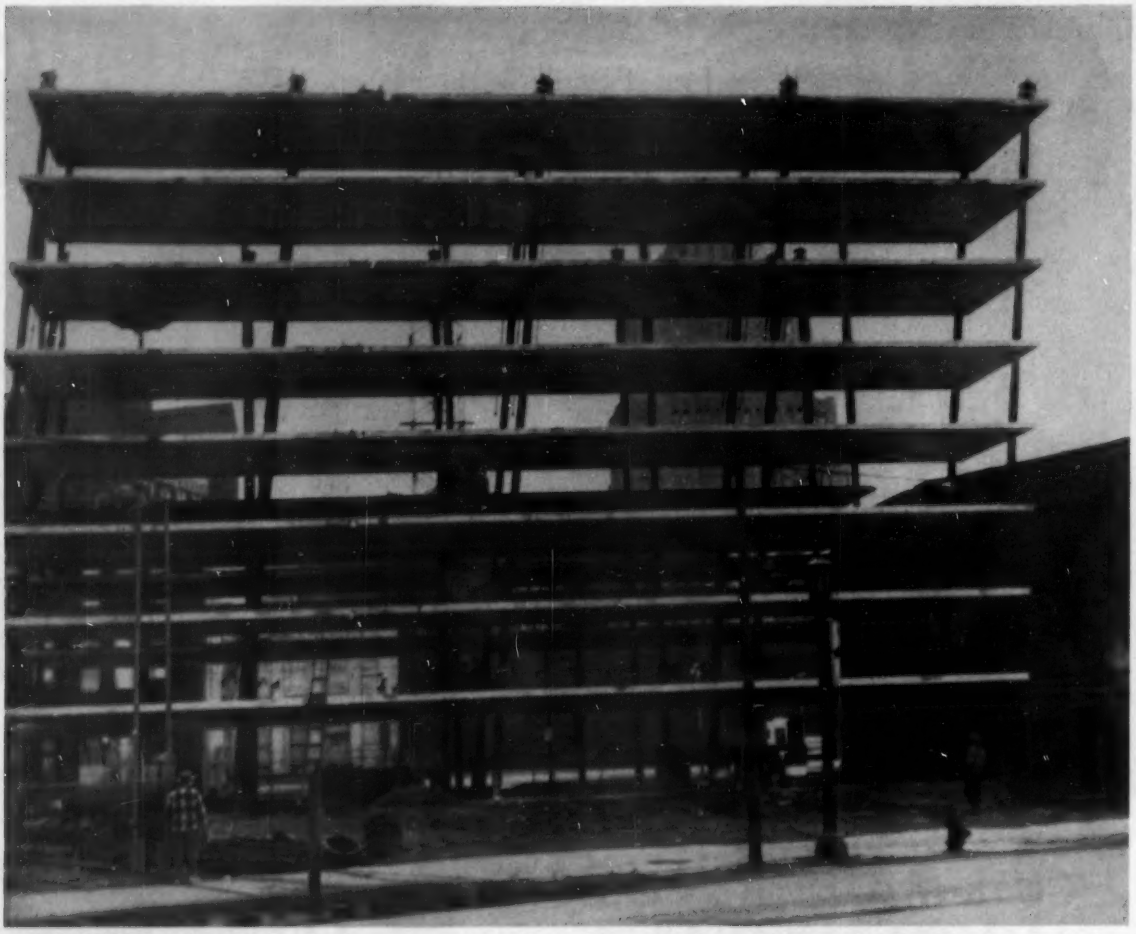


Y wall trusses incorporated alignment, bracing, shoring and scaffolding requirements.



LIFT-SLAB LEANS 6 deg out of plumb after strong winds buffeted it during the night. But columns can be straightened. Plan calls for delicate jacking on side of each column. Posts and network of cables on each floor brace frame during jacking.

How Would You PLUMB *This Building*

JACKING the sides of columns at the first floor level is the way the contractor chose to tackle the delicate job of replumbing an eight-story lift-slab garage blown more than 6 deg out of line by strong winds.

The building under construction in Cleveland made news when winds varying from 10 mph to gusts of 35 to 50 mph tilted the frame during the night. City officials first demanded that it be razed to the ground. But engineers reported the stress in the columns was under the plastic range, and the columns could be straightened.

As soon as the erector received permission from the City to plumb the frame, they called in A. T. Knudson Co. of Cleveland to handle the delicate operation. Cost is estimated at about $25,000.

The plan is to place two jacks, with a 12x12 timber in between, against each of the ten 61-ft columns that support the 180,000-lb concrete slabs.

As a safety measure, the slabs are shored during jacking. At the five lower floors, 12x12 posts are placed 4 ft away and on opposite sides of each column. They are supported on timber sills. In addition to the shores, 8x8's are lashed to all columns.

During jacking, the cast steel collars embedded in the slabs around the verticals are rewedged. At the same time, a network of cables running diagonally across each floor are adjusted continually to keep the structure braced.

After investigating the failure, Cleveland Building Commissioner William D. Guion blamed the erector, Central Lift Slab Co., Cleveland, for not welding at each floor as the slabs were raised.

"They didn't weld as they went along," he said. "If they had welded at each floor as they put it up, the building would have been braced, and this would not have happened."

The erection contractor lifted the roof and floors for the upper stories first and supported them temporarily at fourth-floor level until the lower floors were in place. Then he raised the upper slabs into position. At each column the slabs were supported temporarily by steel wedges on the underside only.

The plan was to weld all connections at the same time. Normally, steel shear plates are welded to collars and columns as soon as the slab is positioned.

(Advertisement)

No more broken plows on this boulder . . .

New Michigan Turbo-Dozer roots out buried 2-ton boulder

When these pictures were taken, the 2¾-yd. Michigan Turbo-Dozer had just finished clearing some wooded farmland to open up more acreage for cultivation. The farmer asked the Turbo-Dozer operator if he'd try to remove a certain boulder which lay completely buried in the wet loam—he'd broken two plow blades on it. This job—which took the Turbo-Dozer 5 minutes—illustrates what you can do with the Michigan's exclusive power-tilting bowl.

Compare this photo with the large picture. Here the boulder has been brought up to the surface, and the operator has tilted the bowl forward to "float" position to carry it away.

Cut and pry with bowl

Two lateral cuts on the front and back sides of the boulder exposed approximately six inches of stone. Then, crowding in against it, the operator hooked the cutting-edge of the bowl under a projection on the stone—and worked the bowl back and forth through a 33 degree arc to pry it loose. When the boulder loosened, he crowded forward as he raised the bowl—literally *lifted* and pushed the boulder out of its hole.

Full power on all wheels

In addition to its power-tilting bowl, the new Turbo-Dozer features rear-wheel steering: even on turns, *you maintain full power on all four wheels*, except when you declutch the rear axle for highway travel. The 165 hp turbo-charged diesel engine drives through 3-to-1 torque converter, power-shift transmission and planetary-wheel drive axles. This power-train is standard equipment on the Turbo-Dozer: four speeds forward and reverse, top speed 27 mph.

20-page photo booklet

You'll find a full description of the power-tilting bowl, C-frame, power-train and specifications in a 20-page photo booklet—write for a copy. The new Turbo-Dozer combines rubber-tired speed with outstanding traction and power—28,000 lbs. maximum rim-pull, on 18.00-25 low pressure tires or optional 23.5-25. For faster cycles, more yardage or tonnage in every shift, take a look at the new Michigan Turbo-Dozer.

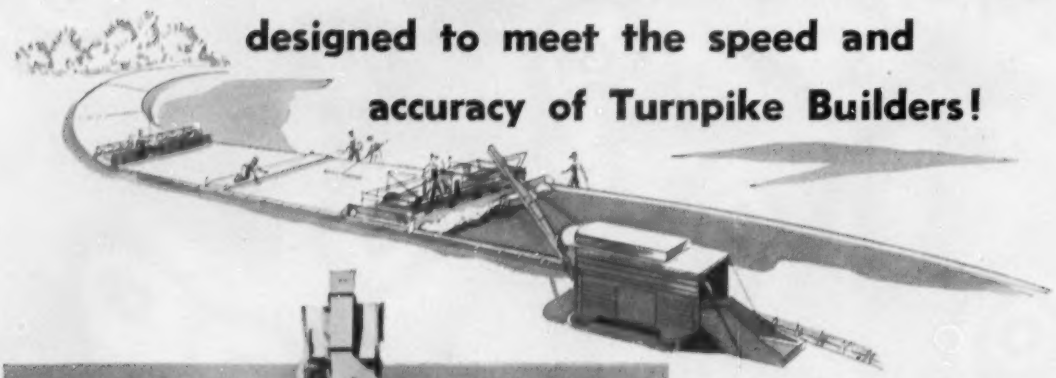
Michigan is a registered trade mark of

CLARK EQUIPMENT COMPANY
Construction Machinery Division
2403 Pipestone Road
Benton Harbor 21, Michigan

CLARK® EQUIPMENT

Strictly for Production

New Heltzel Batchmaster Plants designed to meet the speed and accuracy of Turnpike Builders!

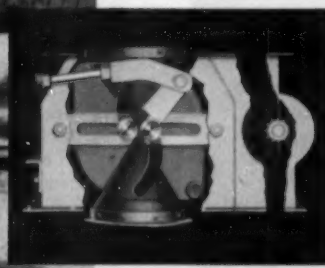


HERE are the paving plants the industry has been looking for! Big capacity Heltzel Batchmaster Production Paving Plants that have the portability, speed and accuracy to more than meet modern day work schedules and job specifications.

Let's look at the Standard E-3 Automatic Cement Batchmaster. Of flare leg design, to permit easier truck access, the plant has the exclusive Heltzel combination gravity vane cement charger (below) that means the fastest, most accurate batching yet possible. Designed for fast, easy dismantling, it easily comes within the dimension limitations for over-the-road hauling. The plant itself will hold up to 609 bbls. of cement. Add Heltzel's high speed recirculatory system and this capacity can be expanded to over 1600 bbls. Smaller size recirculators also available.

A perfect mate to the E-3 is the Type 200 Batchmaster aggregate plant. It is a sturdily built, portable plant that holds a full 200 tons. Yet it can be quickly dismantled into four sections for transporting from one location to another. It is compartmented to suit requirements. It will carry the largest batchers made, including Heltzel's exciting new electronic unit.

If your program for this year calls for the placement of a large quantity of concrete, these plants will save their initial cost in short order. Before you buy equipment, let us show you their many advantages. And remember, it costs no more to own Heltzel Batchmasters—so why not operate with the finest.



The amazing Heltzel Combination Gravity Vane Cement Charger that permits cement batching with a speed never before attained, to an accuracy that has rewritten the record books. It's standard equipment on all automatic Batchmaster plants.

THE HELTZEL

Paving!

HELTZEL

BATCHING PLANTS

Heltzel is one of the nation's leading proponents of automatic and electronic batching. Let their sales engineers show you the latest in these modern day batching techniques.

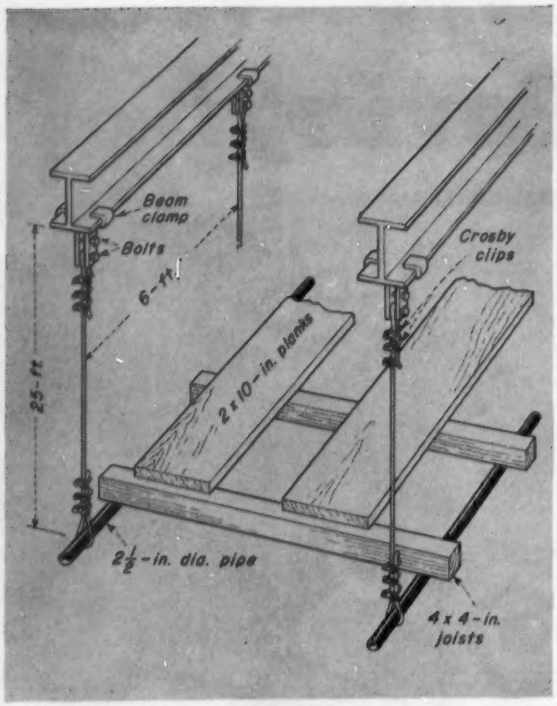
STEEL FORM AND IRON COMPANY

75000 THOMAS ROAD **WARREN, OHIO**

Hang Scaffolds From Ceiling To Free Floor For Other Work

A SIMPLE METHOD for hanging large areas of interior scaffolding permits working on ceilings without encumbering floor areas below. It is helping meet construction schedules on New York's $35 million Coliseum.

The scaffolds are in the 150x150-ft main exhibition hall which rises 75 ft from floor to ceiling. They are just lengths of pipe hung by steel cables from ceiling beams and crossed with joists and scaffold planks. But they are saving time in the race to complete the huge structure—two years under construction—in time for exhibition commitments. Construction is under a joint venture of three New York City firms: Walsh Construction Co., George A. Fuller Co., and Slattery Contracting Co.

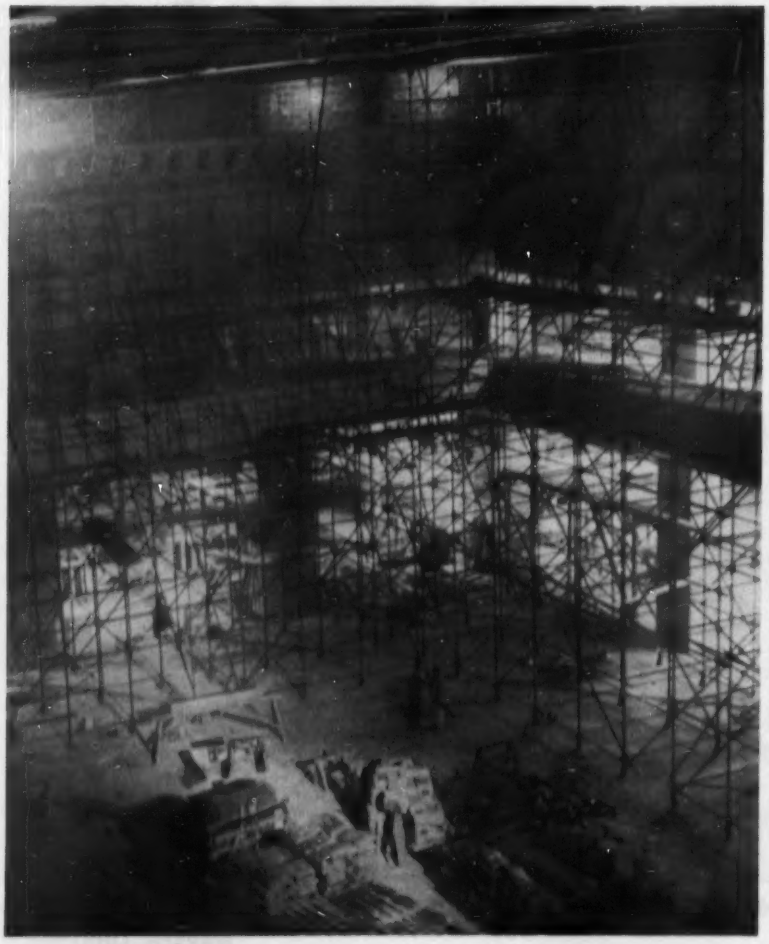


SECRET OF SYSTEM is clamp which enables cables supporting scaffolding to be secured to ceiling's structural beams.

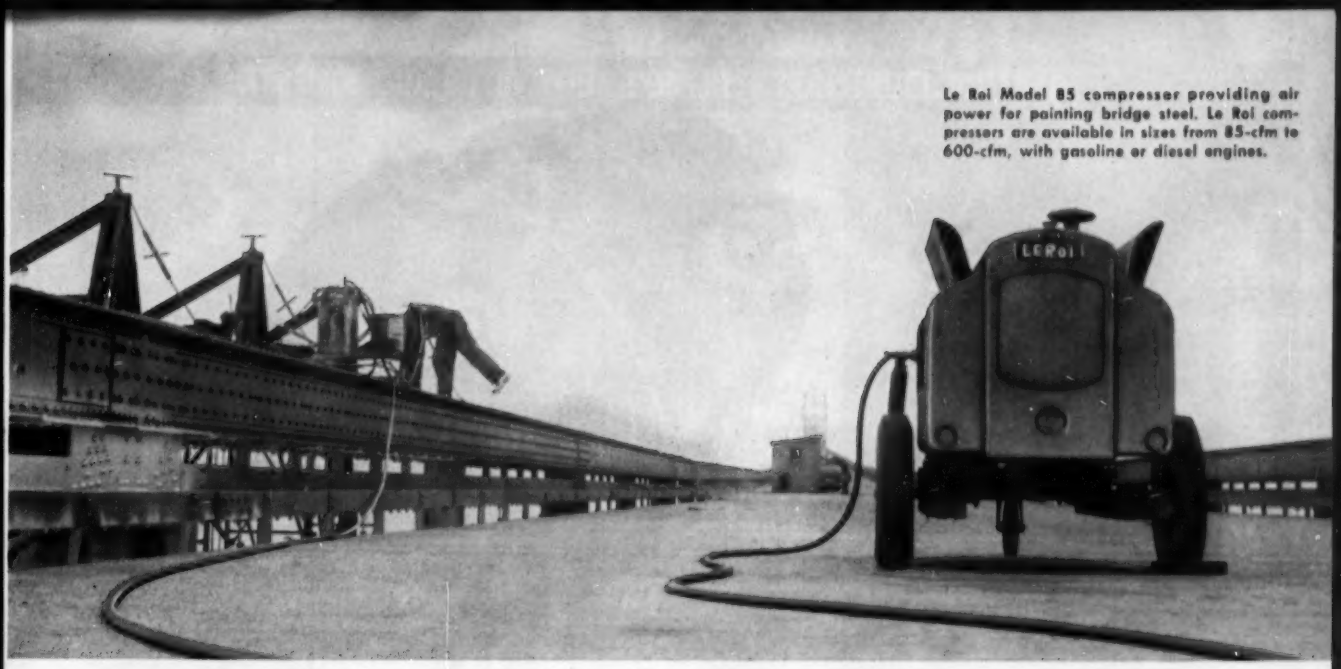
Thomas G. Rome, job superintendent, had thirteen 65-ft tubular scaffold towers measuring 20x20 ft on the job for plastering, painting, and electric installation. His first thought was to group these towers into one big scaffolding for heating, ventilation, air conditioning, plumbing, bus ducts, pipe covering, plastering, and painting.

But using the towers meant blocking up most of the available floor space underneath. That meant interior work and ceiling work would have to be done at different times. Rome wanted to do them simultaneously. Hanging 22,500 sq ft of scaffolding 25 ft from the ceiling was his answer. The scaf-

(Continued on page 185)



TUBULAR TOWERS allow men to plaster and paint walls while work goes on above them on easy-to-build scaffolds.



Le Roi Model 85 compressor providing air power for painting bridge steel. Le Roi compressors are available in sizes from 85-cfm to 600-cfm, with gasoline or diesel engines.

4 Million Cubic Feet of Air Power per Day Speeds New Bridge Construction

Le Roi Airmaster Compressors provide power for sand-blasting and spraying 46,000 gallons of paint on new 21,243-foot bridge.

Also use Le Roi airpower on construction work at water level.

Working air power, in the yard, on the deck, and at water level, totals about 4 million cfm a day.

Nearly 200 feet above San Francisco Bay, a fleet of Le Roi compressors provides 95% of the air power for spraying 46,000 gallons of paint on new bridge steel. The project is a $62 million bridge to span 4.4 miles of windswept water. It will link the cities of Richmond and San Rafael, California.

Compressors exposed to elements. High up on the bridge structure, Le Roi compressors are exposed to cold, moist, salt-laden winds. Only equipment designed for the toughest construction work can give top performance under these conditions — another reason why contractor D. E. Burgess uses Le Roi compressors to spray 46,000 gallons of paint on four miles of bridge steel.

Sandblasting is rugged work. Back in the yards, Le Roi compressors are also providing air power for sand blasting. It's tough, continuous work . . . fills the air with abrasive dust. Yet Le Roi compressors keep a steady flow of air power at work. They're easy to start, too. That's why more than a dozen compressors are used on this enormous and important project.

Prime contractors on this bridge project are Judson Pacific, Murphy, Kiewit. Upon completion, it will be the world's second largest bridge surpassed only by the famed San Francisco Bay bridge.

Le Roi's are designed for dependability. Le Roi compressors were chosen for this big project because they combine long service, good fuel economy, low cost maintenance, and deliver more cool, clean air for less money. Valves are interchangeable and accessible for quick, easy maintenance. You also get more generous cfm with lower rpm. Lower rpm means lower speed — the result, less heat, less wear, and less fuel.

LE ROI Division of Westinghouse Air Brake Co., Milwaukee 1, Wisconsin, manufacturers of Cleveland air tools, Tractair, portable and stationary air compressors, and heavy-duty industrial engines. Write us for information on any of these products.

80-63

This Le Roi 600-cfm compressor is providing air power for tough job of sand blasting new steel. It's one of a fleet of Le Roi compressors at work on 4½ mile bridge project.

ADD PUSH... SUBTRACT FUEL!

AiResearch Turbochargers give your diesel far greater power while actually decreasing fuel consumption, noise and smoke!

In mobile diesel engines, where size, weight and fuel capacity must be limited, AiResearch Turbochargers add more power per inch, pound or gallon of fuel than any comparable installation.

An example is the remarkable success achieved in the recent application of these power packages to Caterpillar diesel machinery.

Equally impressive power increases can be achieved in the application of AiResearch Turbochargers to stationary diesel equipment. Here, the outstanding benefits added to the output boost will be lower operating costs and abatement of noise and smoke problems.

AiResearch is the largest producer of small turbomachinery in the United States, with twenty-five *million* hours of experience. This unmatched experience explains why AiResearch Turbochargers lead in power, economy and dependability. Your inquiries are invited.

THE GARRETT CORPORATION

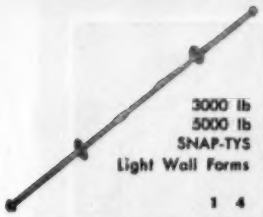
AiResearch Industrial Division

9225 Aviation Blvd., Los Angeles 45, California

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND RELATED MACHINERY

RICHMOND REFERENCE GUIDE FOR YOUR CONCRETE CONSTRUCTION NEEDS

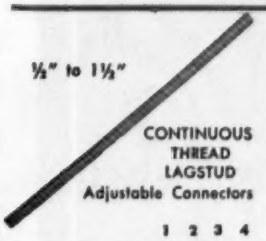
CUT OUT AND FILE



3000 lb
5000 lb
SNAP-TYS
Light Wall Forms
1 4

½" to 1½"
2 STRUT
TYSCRUS
Heavy Wall Forms
1 2 3 4

1" to 1½"
4 STRUT
TYSCRUS
Mass Concrete Forms
2 3



½" to 1½"
CONTINUOUS
THREAD
LAGSTUD
Adjustable Connectors
1 2 3 4

½" to 1½"
TYLOOPS
Form Anchorage
3

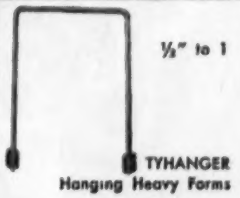
⅜" to 1½"
SCREW ANCHORS
AND BOLTS
Anchorage to Concrete
2 3

1¼" - 1½"
WHIRL-WIND
ANCHORS
(No Slip)
Lift Form Anchorage
3

¼" to ¾"
THREADED INSERTS
Fastening to Concrete
1 2 3 4

⅝" - ¾"
PEERLESS WEDGE INSERT
Shelf Angle Support
1

SNAP-TY
HANGER
Hanging Light Forms
1 4

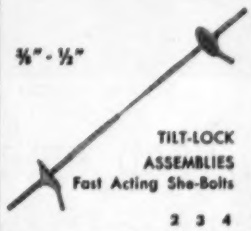


½" to 1
TYHANGER
Hanging Heavy Forms
1 2 4

HANGER
FRAME SCREED
Form Hanging
and Screeding
2

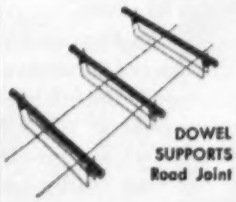
ADJUSTABLE
SCREED CHAIR
Screeding Slabs
1 2 4

REINFORCING
BAR SUPPORTS
Steel Support
1 2 3 4



⅜" - ½"
TILT-LOCK
ASSEMBLIES
Fast Acting She-Bolts
2 3 4

TYFRAME
Stadium Forms
1

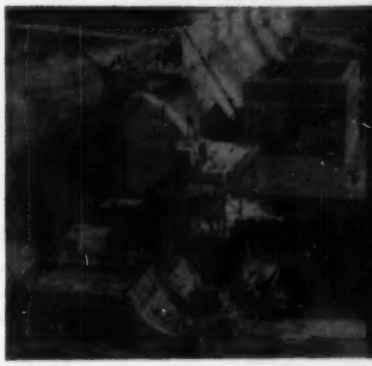


DOWEL
SUPPORTS
Road Joint
2

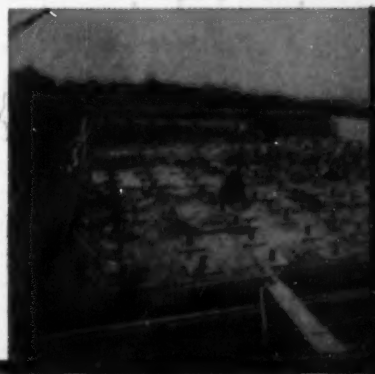
LOAD
TRANSFER
ASSEMBLIES
Airport Slabs
2

buildings ①

roads & bridges ②



tunnels & dams ③



water & sewage PLANTS ④

The above is a partial showing of the 358 items contained in the Richmond line of engineered concrete form-tying devices, anchorages and accessories—the largest line in the field. All items are designed for specific uses, not only for the fields pictured above but also for the building of *stadiums, grand stands, auditoriums, retaining walls, curtain walls, silos, etc.*

Whatever your concrete construction needs, contact Richmond. Richmond products are engineered to give you extra strength, ease of handling, utmost economy. Write for complete catalogue. If you have a specific problem, Richmond's Technical Division or field service men will be glad to submit drawings, engineering data and proposals. Address:

RICHMOND SCREW ANCHOR CO., INC. — 816 Liberty Ave., Brooklyn 8, N. Y. and 315 South Fourth St., Saint Joseph, Mo.

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... AND BE SURE IT'S RICHMOND!

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RICHMOND REFERENCE GUIDE FOR YOUR CONCRETE CONSTRUCTION NEEDS

Bill Martin, master mechanic, Utah Construction Co., Pima mine project, Arizona

"Union lubricants...keep 'em rolling day and night"

"We've had remarkably good success using Union Oil Company lubricants here at the Pima mine project. And in my opinion, Union's Guardol is the finest motor oil you can put into heavy diesel excavating equipment such as we are using to remove some 190 feet of overburden at Pima.

"As you can see we are working our *Cats, MRSs, Eucs* and other equipment to capacity. However, by adhering to rigid maintenance schedules and using top quality Union lubricants, we can keep 'em rolling day and night with an absolute minimum of downtime."

More and more of the world's largest equipment operators now specify Union's heavy-duty motor oils and multi-purpose greases. Why? *Because their experience has convinced them that Union Oil products are, in fact, the finest.* Ask your nearby Union Oil representative for his recommendations on lubricants for your equipment. Your experience with Union lubricants will convince you, too.

UNION OIL COMPANY 76
OF CALIFORNIA

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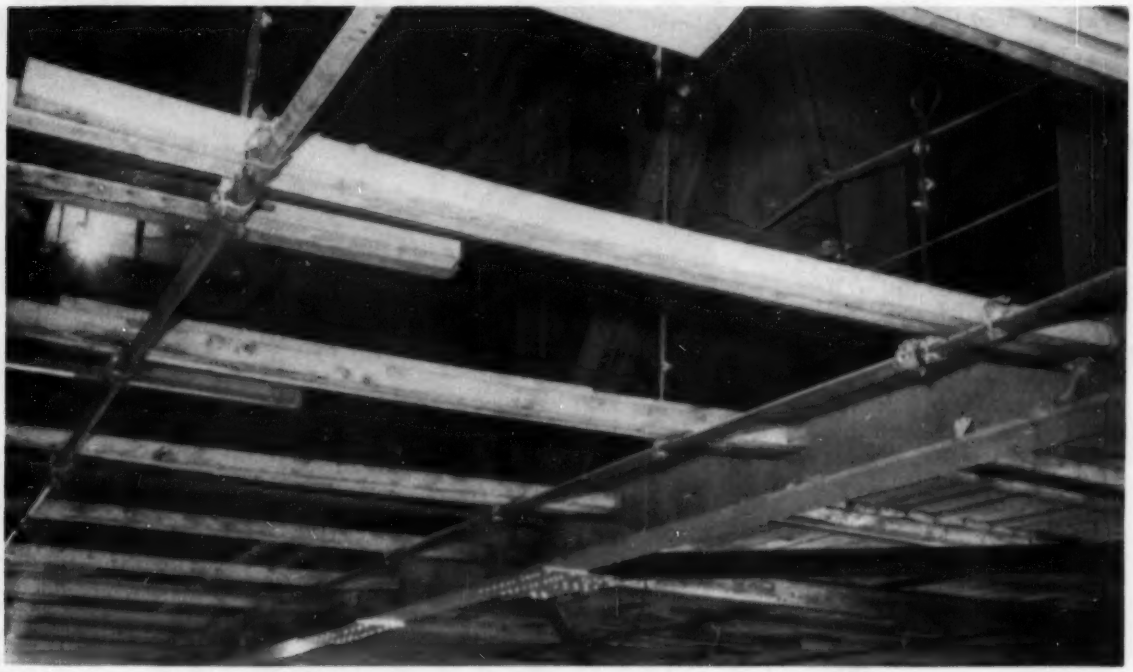


STEEL PIPES support 4x4-in. joists and 2x10-in. planks all of which hang from beams by cables. Chesebro-Whitman was supplier.

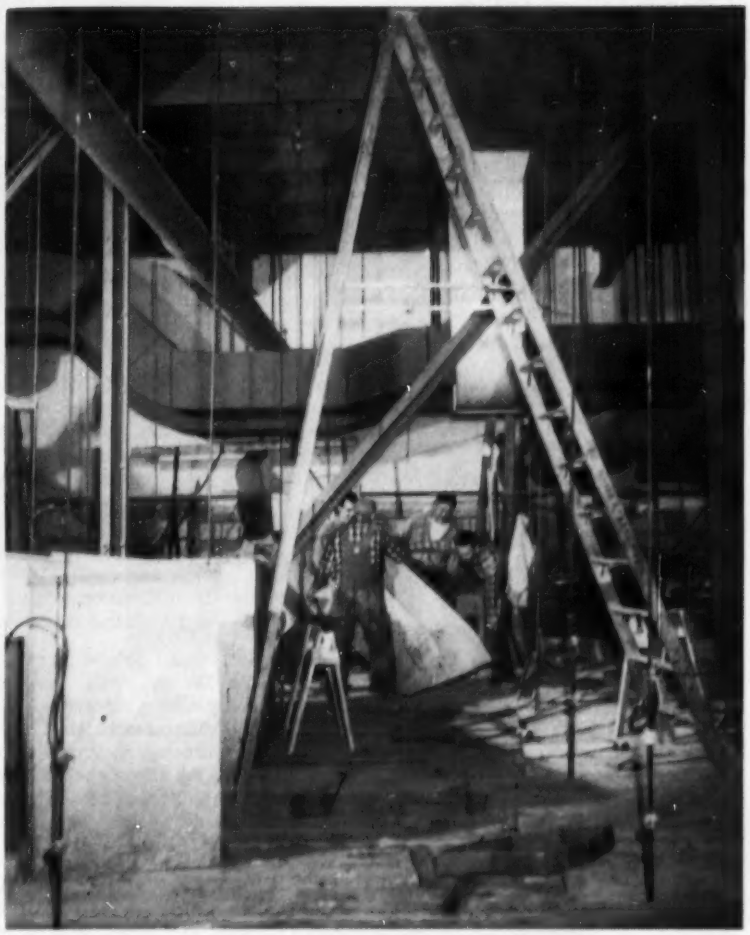
folding and its erection plan were supplied by Chesebro-Whitman Co.

Scaffolds are suspended from structural roof beams by a simple cable strap assembly consisting of a beam clamp (see diagram) and a ½-in. round steel cable 25 ft long. The cable is looped at the bottom and secured with Crosby clips.

Clamps first are fitted to the beams 6 ft on centers both ways. Workmen then run lengths of 2½-in. dia pipe through their bottom loops. Over these they place 4x4-in. joists spaced 2 ft on centers. Scaffold planks are run over these transversely.

Once installed the scaffolding is steady enough to permit the use of stepladders with safety. And it permits more than 11 trades to work on ceiling and floor at the same time. Initial expense of the scaffolding ($17,000 to install) is reduced by pro-rating the cost between the eight trades using it.

Rome continues to use the tubular towers while the hanging system is at work but avoids having to cluster them into one huge scaffold tower.



RIGIDITY OF SCAFFOLDS permits workmen to use stepladders safely. Men are working with sure footing 70 ft high.

(Advertisement)

New Rotary Trowel enters field

"What we need is a really rugged trowel, one that can't get away from you and crack up", said one veteran concrete man when interviewed.

Because Stow Manufacturing Company, makers of concrete vibrators and screeds in Binghamton, New York, decided to make a Rotary Trowel, an exhaustive study was conducted to find out what concrete men wanted in a Rotary Trowel. Stow knew they were getting into a field where competitive manufacturers were well established, and that they had to come up with a machine that would be superior to any other on the market.

Thousands of dollars were put into the design and perfection of the Stow Roto-Trowel. The result: the G-34 Roto-Trowel; a rugged, safe, easy - to - handle machine that trowels smoothly.

STOW ROTO-TROWEL FINISHING A SUPERMARKET FLOOR. Before trowelling, a Stow screed was used to strike-off the surface. By screeding and using a 1" slump concrete, the concrete set up so fast, they were able to put the Roto-Trowel on the job only 1 hour after screeding.

Probably the most outstanding feature on the G-34 Roto-Trowel is the stationary guard ring, instead of the conventional rotating type. With the rotating type guard ring, the operator must be extremely careful whenever he works near walls and obstructions; if the ring should touch any object, it could wreck the trowel and injure the operator. With the Stow Roto-Trowel's strong stationary guard ring, the operator can trowel much closer to walls and obstructions with no fear of accidents.

Another feature is the fool-proof clutch control. This is a manually actuated clutch controlled by a lever on the handle. The instant the operator releases pressure on the handle, the blades stop rotating. The engine, however, continues to operate, thus eliminating the need to re-start the engine. This type clutch is an important safety feature of the Stow Roto-Trowel; and unlike centrifugal clutches, the engine can be started at full throttle. With this type of drive, the operator can throttle the trowel down from 100 RPM to 25 RPM where special conditions require slow speed.

THIS DEAD-MAN CONTROL on the wide cross-bar of the handle immediately stops the machine, but not the engine, when it is released.

The Stow G-34 Roto-Trowel is powered by a 2½ HP gasoline engine which supplies ample power for even high slump concrete. The unit has an adjustable handle so the operator can set the height to his most comfortable operating position. This feature, plus the wider handle, makes the Roto-Trowel much easier to maneuver, regardless of the height of the operator.

On a construction job where one Stow Roto-Trowel was put in among competitive trowels, the contractor discovered that his trowel operators were actualy arriving on the job early each day in order to use the Stow Roto-Trowel. They found it much easier to handle.

A hook mounted on top of the engine makes it easy to lift the Stow Roto-Trowel to higher levels. A knob on the handle controls blade pitch while the machine is running. All three blades fit into recessed slots to insure correct seating; each is secured by a hand-turned wing nut for quick changing. Float blades are 10x14 inches; finish blades are 6x14 inches. Finish blades are made of the finest steel available, chrome vanadium, and can be reversed for double life. The G-34 Roto-Trowel, complete with a set of float and finish blades, weighs 143 lbs. and is 34 inches in diameter.

Stow now has a 24-inch model, the G-24, and a big 4-bladed 46-inch trowel, the G-46. A 34-inch electric trowel is also available with 1½ HP motor.

Contact your nearest Stow Distributor for a demonstration, or write Stow Manufacturing Co., 31 Shear St., Binghamton, N. Y. Ask for Stow's complete catalog on Concrete Vibrators, Portable Concrete Grinders and Vibrating Screeds, and Rotary Trowels.

STOW **MANUFACTURING COMPANY**
31 Shear Street
Binghamton, New York
Originators of the Flexible Shaft

How to switch "rigs" on the go...
get "four-for-one" machine utility!

From the seat and on-the-go you instantly get any material-moving action you need with an International® Drott® Four-In-One!

You'll be cascading dirt in dozer position and suddenly need carry-type scraper action. Touch the "machine selector" lever with finger-tip ease, and you have it—to grade, strip, or spread with accurate clam lip control!

Touch! again, for Skid-Shovel position. And with exclusive Drott triple-power, pry-over-shoe break-out action, you can be tearing up and loading stuff as tough as concrete pavement—often where even a power shovel fears to tread!

Touch! once more—and a fast-working clamshell can be gulping aggregate in a space barely big enough to contain your outfit! And giving you a "hopper-high" dumping reach, 30 inches above ordinary roll-forward buckets!

Prove to yourself a Four-In-One will save uncounted hours of changeover time—give 4-machine utility for one moderate investment. Now available in 3 sizes: 1-yard to 2¼-yard capacity, all with the built-in protection of exclusive, shock-swallowing Hydro-Spring. Ask your International Drott Distributor for a Four-In-One demonstration!

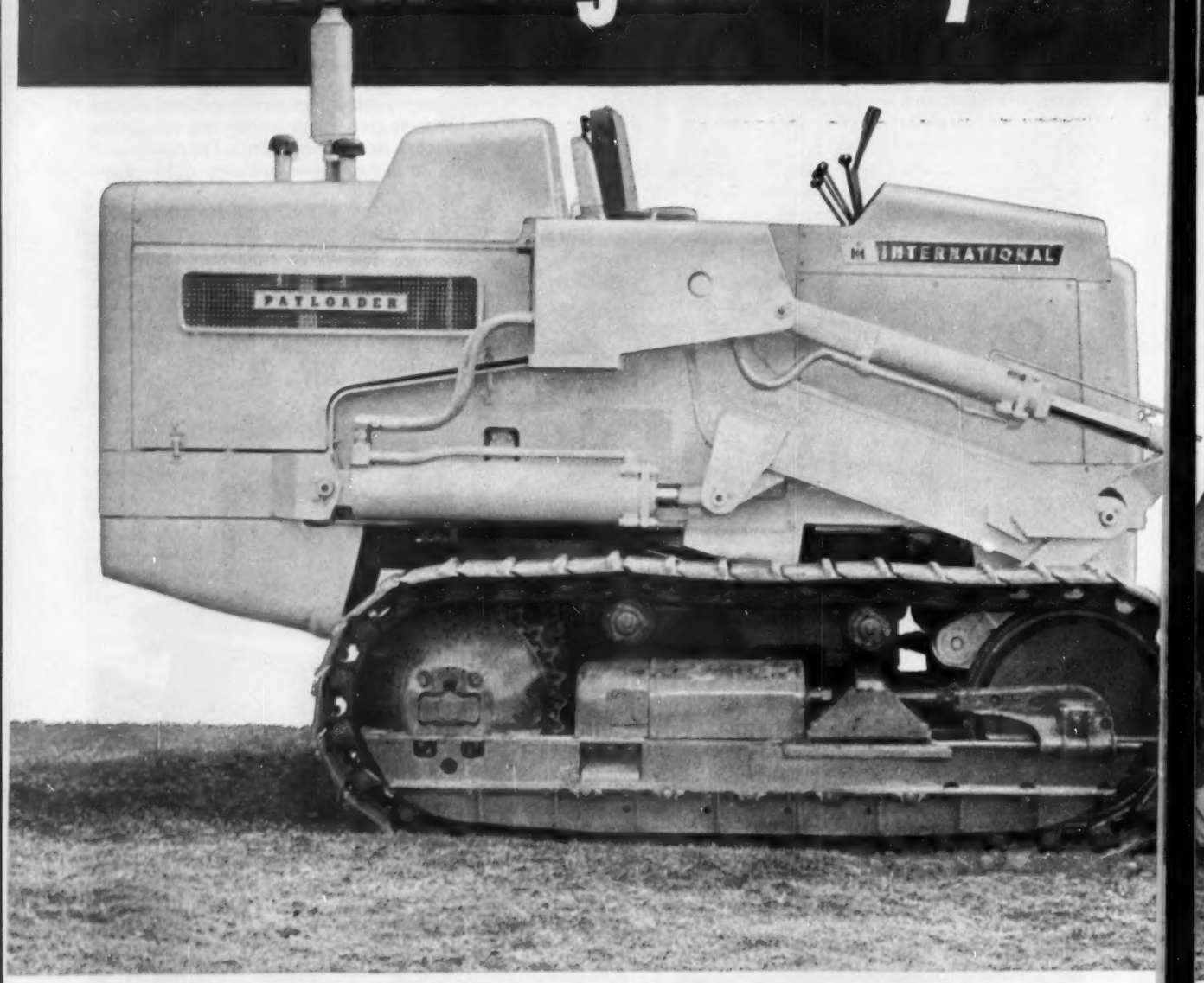
Material-Loosening Scarifer Attachment! It's simple to install this scarifer attachment, to speed straight-forward bucket loading. The third or extra valve (which is standard equipment on all Drott Skid-Shovels) is used in this operation. This hydraulic-controlled scarifer has deep penetration, and strength for hard materials. See and try it!

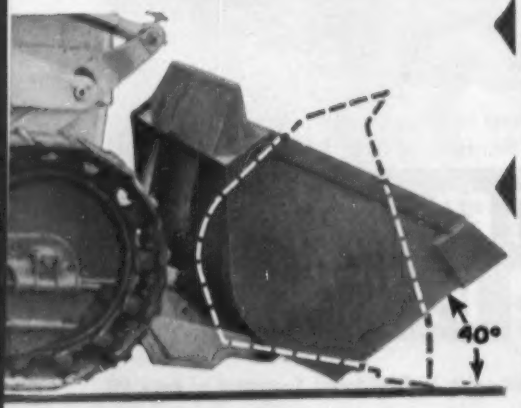
International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 8, Wis.

INTERNATIONAL®
DROTT

AMAZING!...NEW!...

Rear-engine 1¾ yard





PRY-OUT BUCKET ACTION: Tremendous 17,500-lb pry-out force is obtained by using break-out pads on ground as fulcrum for leverage. This transfers load forces to ground instead of to machine.

40° BUCKET TIP-BACK AT GROUND LEVEL permits digging of bigger bucket loads, *plus* retaining of more of load in bucket during lifting and carrying.

OPERATOR SITS COMFORTABLY in foam-rubber seat, handles conveniently-placed, power-boosted controls, can see load and cutting edge at all times.

International® Payloader®

- **New—this highly-maneuverable crawler tractor-loader with "power-shift" transmission teamed with Torque-Converter advantages—to give you maximum possible material-moving capacity and speed in any given condition.**
- **Operator sits up front, close to bucket, can always see what he's loading, where he's going.**
- **Speed unmatched in crawler history, 10 mph forward, 13 mph reverse, provides faster cycles.**

If it's *speed* and *maneuverability* and *big capacity* you want in a crawler-loader, see the new International 1¾ yard Model 12 Payloader!

This amazing new 91½ hp loader seats its operator *in front of the engine*, up close to the bucket, where he has an unobstructed view of everything from cutting edge to toe of bank. It balances the tractor between rear-mounted engine and front-mounted bucket. Weight is evenly distributed over entire length of tracks. You get better traction, longer track life, better stability on grades, less bogging down in spongy ground.

Your operator moves faster on this new Payloader, too. He can go up to 10 mph forward, 13 mph in reverse. He changes speeds or direction instantly through a full-power shift, three-speed transmission. No waiting, no stopping, ever! *All* shifts through *all* speeds can be made in either forward or reverse under full engine speed WITHOUT SLOWING DOWN. Torque-converter gives you maximum digging-power for the toughest jobs. (Operation gets *another* boost from the torque converter . . . it provides an infinite range of speeds, automatically selecting the one which best balances load and torque.) Steering is a finger-tip cinch, too, because each *steering clutch* and *brake* is controlled by one power-boosted lever *only* (no foot steering brakes).

Try this new International Model 12 Payloader for yourself. Your International Industrial Power Distributor will be glad to demonstrate. Call him soon! A good deal awaits you!

INTERNATIONAL HARVESTER

International Industrial Power

180 N. MICHIGAN AVENUE, CHICAGO 90, ILLINOIS

A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Pipe-Boom Tractors . . . Self-Propelled Scrapers and Bottom-Dumps . . . Tractor and Rubber-Tired Loaders . . . Diesel and Carbureted Engines

NOW...

to match the new ...

1. Side plates are of abrasion resistant high strength steel, securely fused to moldboard and box sections by low-hydrogen welding. They prevent load spillage, allow you to carry larger loads. Standard on all international bulldozer blades.

2. Push arms are sturdily constructed of box sections. Side plates are mill-rolled with integral back-up bars to support top and bottom plates. Machine welding guarantees uniformity of weld.

3. Headless pins, locked by eye bolts, secure struts to blade. For removal, pins can be driven out in either direction. On hydraulic blades, all control linkage is connected to the blade through self-aligning bearings.

4. Entire perimeter of blade is backed by heavy box channels solidly fused to moldboard. With this type of construction moldboard, box channels, and welds flex freely to prevent weld failure.

5. Spillboard is wide and high to prevent spillage over top of blade. Note that it is curved to match the contour of the moldboard, thus aiding boiling action. Width of moldboard allows you to carry full load for which the blade was intended.

6. Moldboard is formed from a single sheet of low-alloy, high-strength steel. International blade is shaped to perfect curvature in a special forming machine to assure uniform strength and stress resistance over entire area.

7. Shear bars welded to moldboard support end bits and relieve stress on end bit bolts. Lower edge of end plate is reinforced by wear plate to add strength at corners, increase wear resistance.

New blades designed from "ground" up

To make full use of the greater work capacity of the new Bonus-Powered International crawler tractors, we now offer a complete line of newly designed blades matched to tractor power.

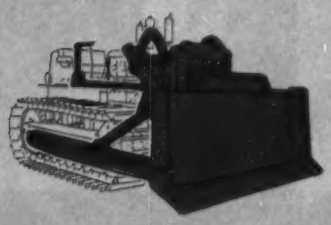
These new blades are rigidly supported around the edges by box sections to give the blade strength but also permit the moldboard to "breathe" under load stresses. New automatic welding processes guarantee that the welds in International blades will hold up under *any kind of job conditions.*

International blades will last far longer and give you far less trouble than any others you have ever hung on any tractor. When you inquire about the new line of Bonus-Powered International crawler tractors, ask your International Industrial Power Distributor for all the facts about the new line of matching blades. See for yourself that they are the best designed, best constructed on the market.

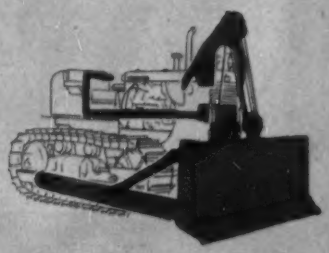
Write For New Blade Literature: An illustrated specification list of the *228* attachments available for International crawler tractors is just off the presses. For your free copy of Mailing Folder CR-492-F, write Consumer Relations Department, International Harvester Company, 180 North Michigan Avenue, Chicago 1, Illinois. No obligation, of course.

..42 new blades

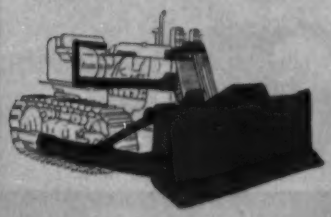
Bonus-Powered International crawlers



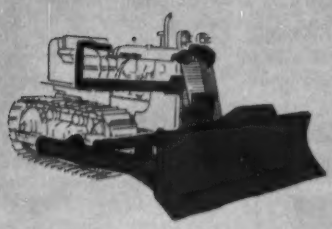
Direct Lift Hydraulic Bulldozer
Operates off front-mounted, gear-driven pump which gives fast blade action. Self-aligning bearings prevent binding of linkage.



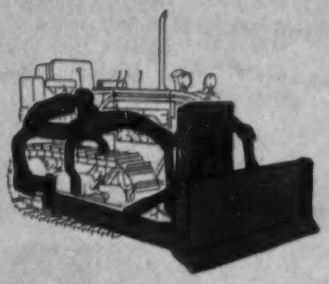
High-Gantry Cable Bulldozer
Operates off either front or rear-mounted International cable control unit. Available for TD-24, TD-18, and TD-14 tractors.



Low-Gantry Cable Bulldozer
Operates off either front or rear-mounted International cable control units. Available for TD-24, TD-18, and TD-14 tractors.



Hydraulic or Cable Bullgrader
Operates off high or low gantry, front or rear cable controls on TD-24, TD-18, and TD-14 tractors. Hydraulic bullgrader also for TD-9, TD-6, and T-6 tractors.



Track Frame Mounted Bulldozer—Distributes the load evenly over the length of the tracks. Available only for TD-9, TD-6, and T-6 tractors. Bullgrader also available.

International Drott "4-in-1"
Newest of International Drott loaders. Combines Skid-Shovel, Bull-clam, clamshell, and bulldozer in one unit. Available for TD-14, TD-9, and TD-6 tractors.

INTERNATIONAL HARVESTER

International Industrial Power

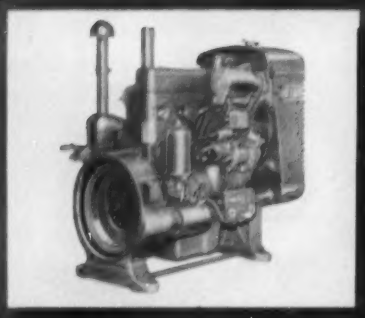
180 N. MICHIGAN AVENUE—CHICAGO 80, ILLINOIS

A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Pipe-Boom Tractors . . . Self-Propelled Scrapers and Bottom-Dumps . . . Tractor and Rubber-Tired Loaders . . . Diesel and Carbureted Engines

To get the advantages that only 54 years of engine

standardize on International®

Here are 3 typical members of the International family of 18



U-169

UD-350

UD-525

U-169, rugged 4-cylinder 48.6 hp valve-in-head carbureted unit, delivers top performance on "regular" gasoline. Can be adapted to burn LPG, natural gas, kerosene, or distillate. Ideal for compactors, ⅜-yd excavators, water well drills, fork lifts, rotary snow plows, 12 to 15 kw generators.

UD-350, 4-cylinder diesel develops 78.5 bhp as an engine, 75 bhp as a power unit shown above. Available in air compressors, bucket loaders, asphalt mixers and driers, ½-yd shovels and cranes, portable screening plants, 25 to 40 kw generators, hoists, graders, pumps, and trenchers.

UD-525, 6-cylinder, 121 bhp diesel with all-weather push-button starting as standard equipment. Available with 14 major attachments, including 43-gal fuel tank, muffler, skid-type subbase. Fits 29 different excavators, graders, compressors, other construction tools.

International power units in various modifications are engineered to team with all these machines:

Shovels, Cranes, Draglines
17 Manufacturers

Motor Graders
5 Manufacturers

Air Compressors
5 Manufacturers

Road Rollers
4 Manufacturers

Asphalt Mixers and Pavers
6 Manufacturers

Crushers
5 Manufacturers

Fork Lifts
3 Manufacturers

Generators
5 Manufacturers

Trenchers
3 Manufacturers

Pumps
12 Manufacturers

leadership can give . . .

Engines

U-450

U-450, one of the most popular 6-cylinder carbureted engines on the market today for trucks, water well drills, 35 to 50 kw generators, graders, ¾-yd shovels and draglines, big rotary snow plows, ditchers and trenchers. Develops 118.5 belt horsepower.

UD-1091

UD-1091, diesel, largest of the 18 International engines, develops 214 bhp, provides exceptional fuel economy for 34 different makes of construction units, including 2 to 2½-yd shovels, 8-cylinder compressors, large asphalt plants and 75 to 100 kw generators.

Engine Model	Displacement (Cubic Inches)	Horsepower (with full equipment less fan)
CARBURETED ENGINES		
U-1	60	17 @ 2500
U-123	123	31.2 @ 2000
U-169	169	48.6 @ 2000
U-264	264	53.5 @ 1600
U-220	220	64 @ 2400
U-240	240	66.5 @ 2400
U-282	282	79 @ 2400
U-372	372	96.5 @ 2200
U-406	406	104 @ 2200
U-450	450	118.5 @ 2200
U-1091	1091	214 @ 1600
DIESEL ENGINES		
UD-264	264	57.5 @ 1800
UD-350	350	78.5 @ 1800
UD-14A	461	100 @ 1800
UD-525	525	121 @ 1800
UD-140-D	525	141 @ 2300
UD-18A	691	131.5 @ 1600
UD-1091	1091	214 @ 1500

In most fields, you'll probably agree, you get the most for your money from the company that's been a leader *for the longest time.*

In engines and power units, the outfit to turn to for longest leadership is International. Since starting manufacture in 1902, International has built and sold *millions of engines* for heavy-duty work! In these 54 years, International has pioneered in developing and perfecting many of the features you consider essential today. Valve-in-head design . . . all-weather diesel starting . . . replaceable cylinder sleeves . . . tocco hardening . . . lubrication through drilled passages . . . precision type bearings . . . full-flow oil filters, to name a few.

These cost-cutting features are backed up with such added advantages as:

Honest horsepower ratings at speeds you can use.

Easy installation with attachments to fit whatever jobs you have.

Fully-experienced sales engineers to help you select and install the engine which best does your work.

Unmatched adaptability, with the same basic engine available as regular or optional power with various modifications in many kinds of equipment (one typical International engine, for instance, fits an International crawler tractor *and 46 makes* of loaders, compressors, asphalt mixers, pavers, excavators, generators, pumps, graders, and rollers). When you power with International, this ready adaptability lessens your parts inventory . . . simplifies and speeds operator training . . . makes your servicing problems a lot easier!

International engine owners get another tremendous benefit, too. To help them is one of the most experienced heavy-duty engine parts and service organizations in the world. At your service are 11 giant regional *parts depots*, 173 Industrial Power *Distributor* locations, *and* hundreds of Power Unit *Dealers.*

To get all these big profit-making advantages, be sure to specify International power. See your nearest Distributor or Dealer for all the facts.

INTERNATIONAL HARVESTER

International Industrial Power

A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Pipe-Boom Tractors . . . Self-Propelled Scrapers and Bottom-Dumps . . . Tractor and Rubber-Tired Loaders . . . Diesel and Carbureted Engines

You get a HALF-TON MORE TRACTOR in the NEW INTERNATIONAL® 300 UTILITY

Stronger front axle, heavier chassis, more rugged power train—the new International 300 Utility leads the field with up to *1,000 pounds greater built-in weight* than other make utility tractors. The result is more stamina, *plus* better tractor balance for work with rear-mounted fork lift, greater traction for dozing, and more rugged strength to stand up under heavy-duty loading operation with a half-yard bucket. Big tires let you lift or load, pull or push equally well on paved or unpaved areas.

10 speeds forward with optional Torque Amplifier, from 1.5 to 16.8 mph . . . change speed, increase pull-power *on the go* for timesaving fork lift operation—handling loads up to 4,000 pounds.

Endless utility! You can equip the 300 Utility with rear-mounted fork lift alone, or use combinations of equipment such as heavy-duty front loader and rear blade (above). For seasonal or special needs, you can change to dozer blade, trench hoe, crane, snow plow, sweeper, mower, drag scraper, hole digger, and other equipment to cut your job costs.

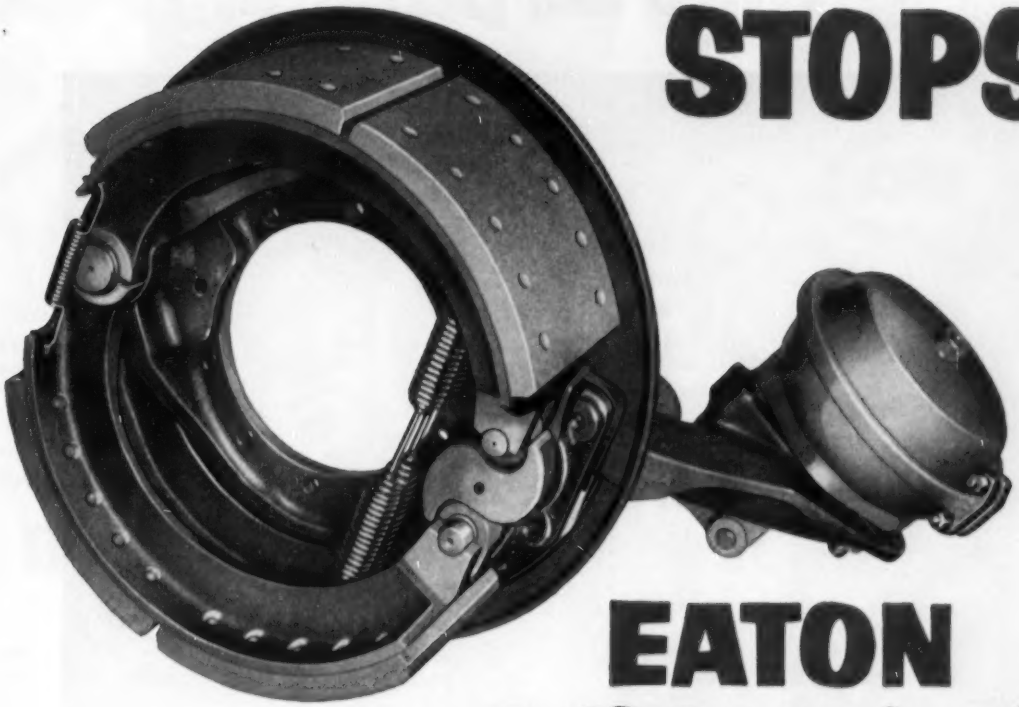
Your International Industrial Power Distributor will demonstrate! Phone today for an on-the-job test. Nearly 50 items of special-duty equipment let you match 300 Utility to your job *exactly*. For free folder, write International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill.

International Industrial Power

INTERNATIONAL HARVESTER COMPANY, 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Pipe-Boom Tractors . . . Self-Propelled Scrapers and Bottom-Dumps . . . Tractor and Rubber-Tired Loaders . . . Diesel and Carbureted Engines . . . Farm Machinery . . . Motor Trucks

for QUICKER, SAFER STOPS-



EATON Self-Contained AIR BRAKES

Greater braking efficiency, quick action, quick release—these are the result of Eaton's compact, close-coupled design, which features reduced bracket deflection, reduced camshaft wind-up, and shorter chamber stroke. For a given input, greater braking effort is delivered at the ground. The strong, rigid chamber bracket, mounted directly on the brake spider, entirely supports the short camshaft, which is completely protected from water and mud. Lubrication of the shaft is provided by a reservoir contained in the bracket.

In addition to quicker, safer stops, Eaton's advanced design provides a number of other important benefits. Floating split-shoe design—using a single pin at the anchor ends, with rollers and floating pins at the cam ends of the shoes—eliminates the need for anchor pin lubrication, and prevents pin seizure. Simply constructed with fewer parts, over-all weight is reduced approximately 15 per cent. Relining is quick and easy, cutting labor as much as two to four hours.

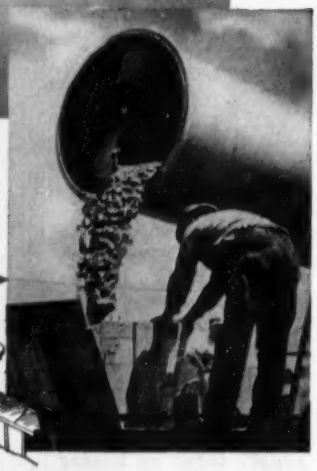
Ask your dealer to supply Eaton air brakes on your new trucks.

EATON AXLE DIVISION MANUFACTURING COMPANY CLEVELAND, OHIO

PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

Slash costly pitting and patching

PHOTO COURTESY QUEBEC HYDRO-ELECTRIC COMMISSION



use GLOBE FORM GREASE

for all Concrete Forms

On job after job, engineers and contractors prove continually Globe Form Grease the definite cost-cutter that reduces peeling and pitting to a minimum and practically eliminates patching in concrete work after steel or wooden forms are removed.

The reason is simple, Borne, Scrymser's Globe Form Grease is a time-tested paste emulsion with exceptional adhering qualities applied with spray, brush, or swab. For utmost effectiveness — only a thin coat is required. Consequently one gallon covers approximately 200 square feet! And more — Globe Form Grease is stainless — leaving a smoother, whiter concrete surface without painting.

Prove to yourself why Globe Form Grease is truly the "wonder grease" for every concrete form. Write for full particulars today.

OILS *and* **GREASES** *for every purpose*

DIESEL • STEAM • AUTOMOTIVE

Our Laboratory Facilities are always at your disposal.

BORNE SCRYMSER Since 1874

RUBARITE — New Powdered Rubber for Tomorrow's Asphalt Construction.

BORNE, SCRYMSER COMPANY

ELIZABETH, N. J. • CHARLOTTE, N. C.

BESIDES MAINTAINING PRESSURE, compressor must also provide an adequate and uniform air supply. Many crews believe that delivery is more uniform from auxiliary receivers.

EACH LINE needs pressure gage on take-off side of the pressure-regulating valves.

From Compressor to Impact Wrench...

Bolting Requires Frequent Checks

IT IS TRUE that bolting crews require less training than riveting crews, but it is also true that the successful application of high-strength bolts in steel erection depends entirely upon proper installation techniques.

Most high-strength bolts are tightened by air-operated impact wrenches, and proper installation really begins back at the compressor, according to Russell, Burdsall & Ward Bolt and Nut Co., a leading manufacturer of high-strength bolts.

Nearly any compressor can maintain the pressure required by impact wrenches. However, RB&W engineers point out, maintaining correct pressure is not the only thing demanded of the compressor. It must also be able to supply the proper quantity of air, and, for the wrenches to work at their best, the air delivery must be uniform.

Most impact wrenches take from 30 to 50 cfm. Therefore, a large compressor should be capable of supplying air for 10 to 12 wrenches, provided the proper quantity of air is delivered uniformly to the wrench. To assure this uniform air supply many erection crews prefer to depend upon separate auxiliary air receivers instead of the compressor's storage tank.

When an auxiliary air receiver is used, at least a 2-in. hose or pipe should connect the compressor and the air tank. Each wrench should have its own take-off directly from the auxiliary receiver, and an air pressure gage should be located on the take-off side of the pressure-regulating valve.

Ideally, whether the air supply is contained in the compressor tank or in an auxiliary receiver, it should not be more than 200 ft from where the wrenches are to be used, and the wrenches should be fed through a combination of ¾ and ½-in. I.D. hose.

Because such things as hose length, temperature, wrench characteristics, and other variables change frequently, wrenches must be calibrated at least once a day and more often when the wrench gets unusual handling.

OPERATOR demonstrates one-turn technique. Nut gets full power turn, indicated by mark on chuck, after being fully seated.

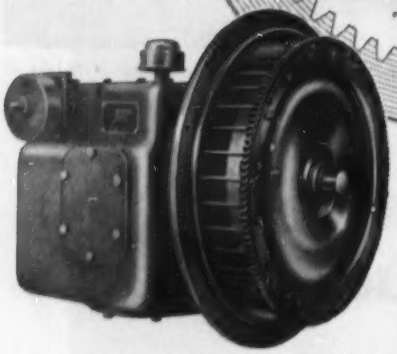
Calibration is important because it provides the proper pressure setting to stall the wrench when the desired torque is reached. Any method that will indicate bolt tension on a gage as the nut is tightened can be used. Several manufacturers have marketed highly portable calibration devices that are set up simply by clamping to a beam.

It is possible to calibrate impact wrenches using only a torque wrench, but this is not as accurate a test as a good calibrator provides. Procedure with

(Continued on next page)

New PLAN-GEAR PGT TRANSMISSION

* PATENT PENDING *



the Transmission that's as simple to operate as an Electric Motor

• AMERICAN GEAR'S new **PGT** is a hydraulically operated, compound planetary transmission that provides a simple, versatile and extremely flexible means of power transmission.

• **PGT's** outstanding performance has been verified by complete tests in the laboratories of one of the country's leading Institutes of Technology.* It has been successfully used on earth movers, tractors, road rollers and similar equipment. Sturdily built, conservatively rated, **PGT** offers important advantages over more complex transmissions, including:

- Easily operated by anyone by merely moving a single hydraulic control lever
- Practically instantaneous (1.5 seconds) change of speed or direction without shifting gears
- Only one control valve lever for all speeds and neutral
- Utterly smooth...no shock...no jerk... no noise
- Cushion shift prevents shock loading, eliminates trouble
- Eliminates operator fatigue by eliminating clutch pedal
- Hydraulic control lever placed convenient to operator without regard to location of transmission
- Planetary gearing means considerably less length for comparable loads and speeds
- Positive pressure-fed lubrication to bearings and gears
- Two power take-off apertures can transmit up to one-third of engine output maximum

*Complete report on request

Write today for this new 8-page booklet which gives complete information, design details on all 7 models of PGT transmissions

• 7 DIFFERENT MODELS • 85 OR 150 TO 200 LB. FT. TORQUE
1 OR 2 SPEEDS FORWARD • CHOICE OF REVERSE RATIOS

USE PGT TRANSMISSION ON

• Lift trucks • Earth movers • Hoists and cranes • Car pullers • Slushers • Conveyors • Power take-offs • Front end loaders • Road rollers • Other industrial equipment • Truck mixers

Designed and built exclusively by

AMERICAN GEAR & MFG. CO.

New Avenue, Lemont, Illinois • Phone: Lemont 920

Subsidiary of BRAD FOOTE GEAR WORKS, INC., Cicero 50, Illinois

HIGH-STRENGTH BOLTS . . .

Continued

this method is to tighten a new nut with a torque wrench to the correct tension, then apply the impact wrench to the nut and regulate the air pressure until the nut barely begins to turn. When you think you have the proper torque setting, use the impact wrench on a few more bolts, then check these bolts with the torque wrench to assure accuracy.

To check a wrench with a calibrator, install a new bolt in the calibrating device and set the regulating valve to a pressure that will come close to stalling the wrench when the proper tension is reached (60 psi for ¾-in. bolts, 70 psi for ⅞-in. bolts, and 80 psi for 1-in. bolts, for example). If the gage shows that additional adjustment is necessary when the wrench stalls, adjust air pressure in increments of about 2 psi up or down until the right tension is reached.

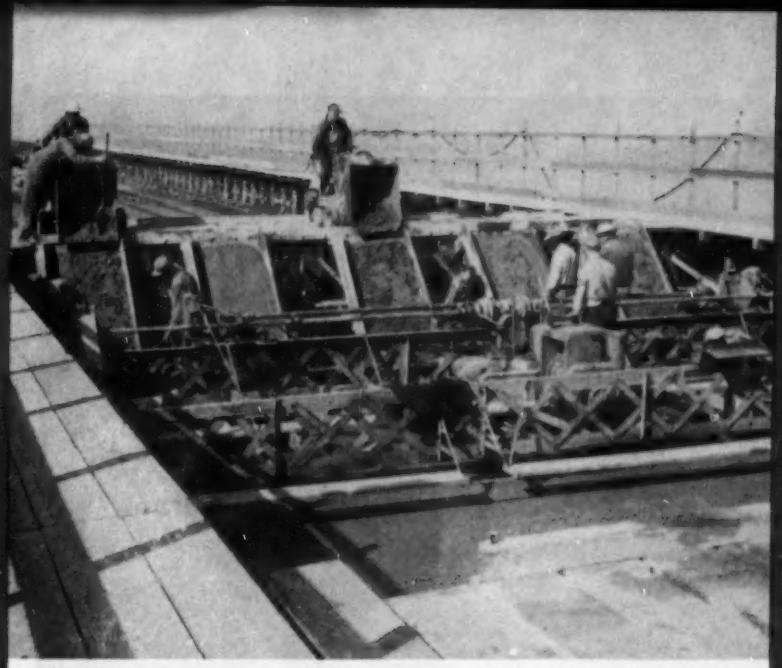
Calibration Tips

Several things should be kept in mind regarding calibration. First, use a new bolt each time. Second, because the initial impact develops the highest rate of output within the first 4 to 7 sec, do not resume tightening the bolt after stopping. Third, the hydraulic gage should not be seen by the operator performing the calibration, in order to remove the human element from the test. Fourth, calibrate while using the same length of hose from the air supply as the wrench will use on the job. Fifth, there is really no maximum bolt tension; just be sure you have at least the minimum setting.

Wrench manufacturers are beginning to find ways to control torque so that the number of checks required will be reduced and calibration will be easier. Ingersoll-Rand, for example, recently marketed a wrench that uses a rugged steel torsion bar to control torque (see Feb. CM&E). With the new wrench, the torque setting remains constant until the adjustment is changed. The torque setting is changed by using a jig that sets the torsion bar and calibration collar to the desired reading on the torque bar adjusting sleeve.

High-strength bolts are made from high carbon steel that has been heat treated so that the bolts have two or three times more tightening strength than common machine bolts. Three radial dashes

Continued on page 203)



Whiteman Power Buggies speed concrete out ramp on one side of Bridge—return on opposite ramp for next load. Keep pouring operation moving at a fast pace. These photographs courtesy of Construction Illustrated.

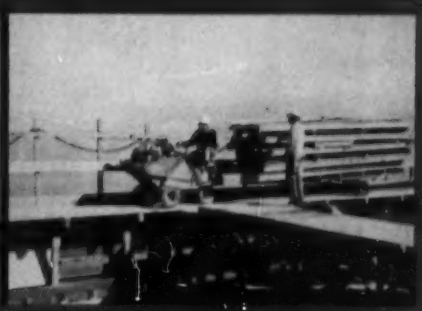
Whiteman

Power Buggies* make SHORT WORK of a LONG HAUL on ¼ mile ramp on San Francisco Bridge†

*Trademark
†Paving by Bliss, Rhodes and Larkin

Whiteman Power Buggies load from truck mixers a quarter mile from pouring site.

Close-up of pouring operations with six Power Buggies at one time



Whiteman Power Buggies haul materials too! Here a load of forms is moved to a new location.

Pouring 14,200 cu. yds. of concrete decking on the Richmond-San Rafael Bridge crossing San Francisco Bay requires carrying concrete over a ¼ mile long ramp from truck-mixer to pouring site. This long haul would have been a slow, back-breaker with hand buggies, but fast, efficient Whiteman Power Buggies placed the concrete in record time.

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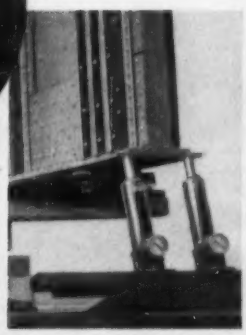
Pictured at right — EA-27 Jack — 27" high, lifts up to 49½". 20 ton capacity; $115.00.



"High Lifts" weigh a bridge. Equipped with gauges, two Blackhawk "High Lift" jacks check the weight of a giant steel bridge section. This model, with full 22½" hydraulic lift, performs countless other tasks that keep construction jobs everywhere moving full speed ahead!

Lift over any span or any angle — Extensions and attachments thread onto the "Porto-Power" jack for fast, easy work. More efficient, and eliminates dangerous blocking as in this photo of a building being raised. Operator stands safely at distance and can sight his job.

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HEAVY DUTY BEARING GREASE

HIGH-STRENGTH BOLTS . . .

Continued from page 198

on the head of the bolt and the black finish resulting from the heat treatment identify them as high-strength bolts.

No harm is done if a common bolt is used by mistake because it will undoubtedly break before it is sufficiently tightened. Even with high-strength bolts, it is not dangerous to tighten too much because as long as the bolts do not break they will do their job, even though tightened far beyond recommended tensions.

After the holes have been lined up with drift pins, high-strength bolts with washers under the bolt head and the nut are used for fitting up. Unlike riveting these fitting up bolts remain in place.

Round, flat, hardened washers are used under all bolt heads and nuts except where the face of the bolted member has a slope of more than 1 in 20. When a bolt passes through a beam or channel flange with a sloping inner face, a beveled washer must be provided to give a square seat for either the bolt head or the nut. The square, beveled washer replaces one of the two round washers ordinarily required.

Get Them Tight

Nuts are spun on by hand as tight as possible and then run up until the wrench stalls. This usually takes from 7 to 15 sec. While the wrench normally is applied to the nut, there is no reason why the impact wrench cannot be used on the head instead of the nut if you're working in close quarters.

Even though set to operate at a definite air pressure, the wrench never really stops. With a little practice, the operator can feel when the bolt is sufficiently tightened. As the nut is run up, the hammering of the wrench gets a little louder, the nut turns very little, and the chuck vibrates or recoils after each blow. Many operators mark the chuck with a file or chalk so they know when the wrench has to make one full power turn, to tighten the nut properly.

In cases where a joint has a line of bolts, tightening of the last few bolts in the line tends to loosen bolts installed earlier. A good idea, according to RB&W, is to tighten a few middle bolts and then start from the end of the line and go back over the bolts already placed. RB&W also warns that fitting up bolts must be re-tightened.

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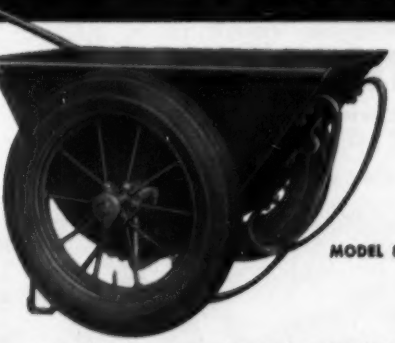

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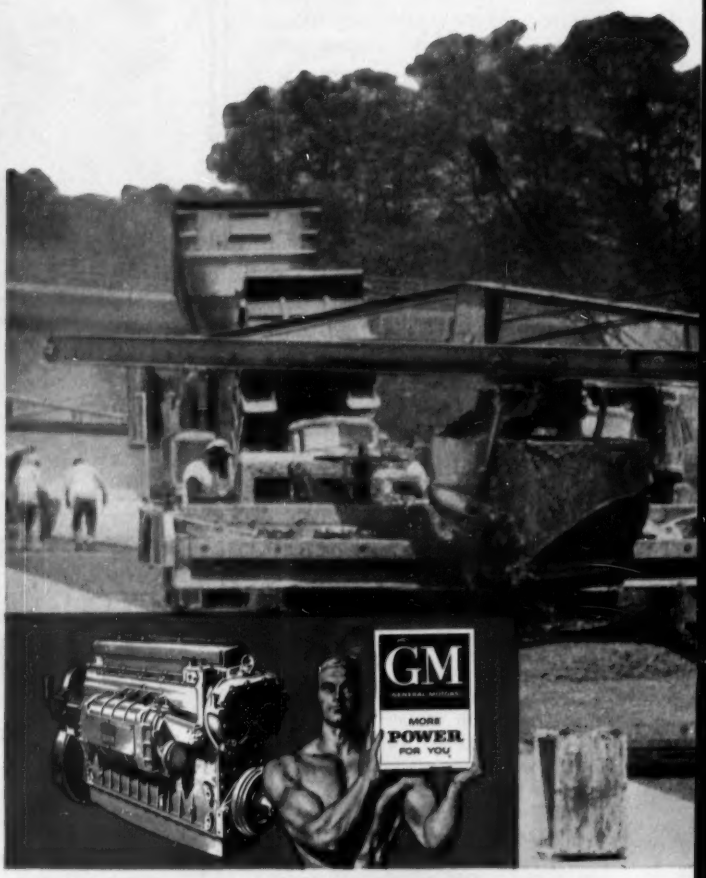

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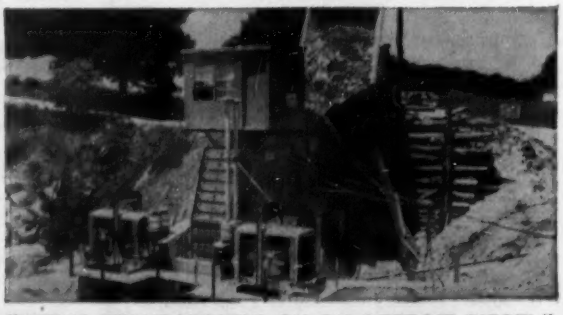
Excavating Contractor Russell F. Davis of Lafayette, Indiana, put this GM Detroit Diesel-powered Northwest 25 in service in 1947, has spent only $150 for repairs since. Now company owns three more excavators—all powered with quick-starting, fast-working GM Detroit Diesels.



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Dependability, fast service, interchangeable parts—these are some of the reasons why Pennsylvania contractor, John S. Teeter & Sons, Inc., has standardized on GM Detroit Diesel power for crushers, pumps, generators and self-powered machinery.

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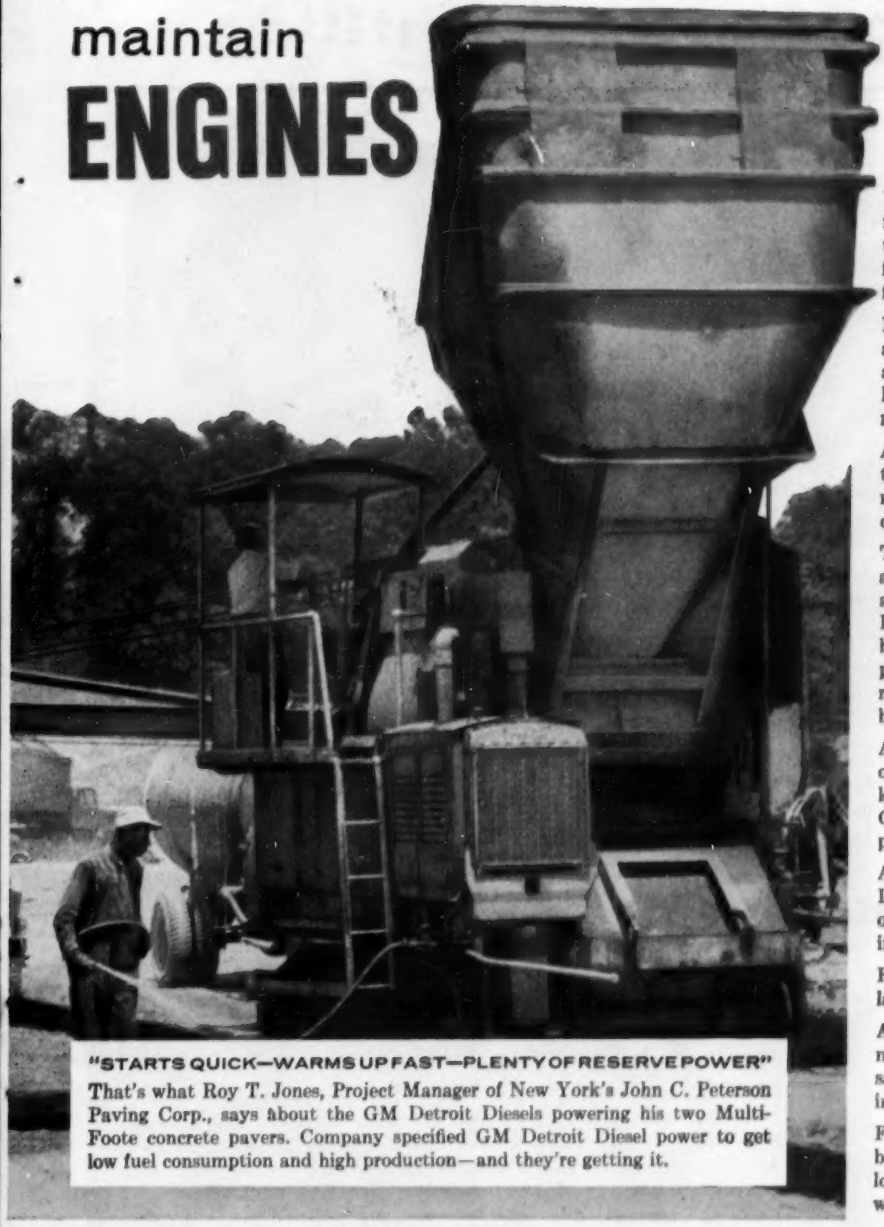

"STARTS QUICK—WARMS UP FAST—PLENTY OF RESERVE POWER"

That's what Roy T. Jones, Project Manager of New York's John C. Peterson Paving Corp., says about the GM Detroit Diesels powering his two Multi-Foote concrete pavers. Company specified GM Detroit Diesel power to get low fuel consumption and high production—and they're getting it.

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And when you call you get action, for these distributors and dealers know the need for speed on construction jobs—completion dates don't wait.

Typical of this speed is the experience of a contractor in West Virginia. He needed an engine overhaul on a scraper. His Detroit Diesel distributor had his scraper back on the job in two hours—because he pulled the engine and replaced it with a rebuilt unit, then took the original engine back to his shop for overhaul.

Another contractor hit subsurface water on an excavation—and his distributor kept the contract going by delivering GM Detroit Diesel-powered Wellpoint pumps in less than half a day.

And when you put your GM Detroit Diesel in the hands of your distributor's or dealer's servicemen, you're putting it in the hands of experts.

For they're factory-trained, know all the latest maintenance and repair procedures.

And they use factory-engineered replacement parts—the same parts, built to the same rigid specifications as the parts used in building GM Detroit Diesel engines.

For full details on the parts and service behind your GM Detroit Diesel, call your local GM Detroit Diesel distributor or write direct.

CRUSHES 280 TONS ON 90¢ FOR FUEL

Minnesota gravel contractor P. O. Pederson switched from a 4-cycle Diesel to a GM Detroit 2-cycle Diesel several years ago, has specified GM Detroit Diesel in two more crushers bought since then. Company reports GM Detroit Diesels start easy, work fast.

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This GM Detroit Diesel-powered Gradall's ability to do a faster job at less cost helped an Illinois contractor win a big contract in Oklahoma. In 400 days he cleared and grubbed 2,493,000 yards to widen and straighten a river and stabilize its banks.

WHEN STORED OUTSIDE tires should be stacked on wood and covered with heavy canvas or some other waterproofed material. Indoor storage is better, but sometimes conditions indoors may actually encourage deterioration instead of preventing it.

How to Store Tires and Tubes

EARTHMOVING EQUIPMENT TIRES are so expensive that you cannot afford to let some of their life expectancy dissolve in storage before they are ever put to productive use.

Contractors generally realize this and make an effort to store them where they will be protected from the ravages of time. However, as the LeTourneau-Westinghouse Co., a leading rubber-tired equipment manufacturer, points out, time alone is not entirely responsible for the deterioration of unprotected rubber.

Contractors are the victims of so many wide-spread misconceptions about where and how to store tires that they may actually be encouraging deterioration, even though they have gone to considerable trouble to avoid it.

As an example, even when an indoor area is set aside for tire and tube storage conditions that tend to break down rubber are likely to be present. Whether stored indoors or outdoors, such natural enemies of rubber as light, oxygen, heat, and moisture can take their toll unless simple precautionary measures are taken.

If tires are kept indoors, the storage area should be as dry as possible, of course. But while tires have to be kept dry, radiators, steam lines, and other heat sources that are relied upon to relieve dampness in the storage area can do more harm than good if they are too close to the tires, or if they give off too much heat. Ideally, the temperature in the store room should be maintained at between 40 and 60 deg F.

Tires stored in the shop are often kept in the same room or in an adjoining room with gasoline and lubricants. Because rubber readily absorbs vapors from petroleum products, and because these vapors tend to weaken rubber, this proximity must be avoided. Like petroleum vapors, ozone is also an enemy of stored rubber. Ozone, which speeds the oxidation of rubber, is often produced by motors, generators, switches, and other electrical devices. Drafts are dangerous for the same reason, because they quickly replenish the oxygen supply that is so harmful to rubber products.

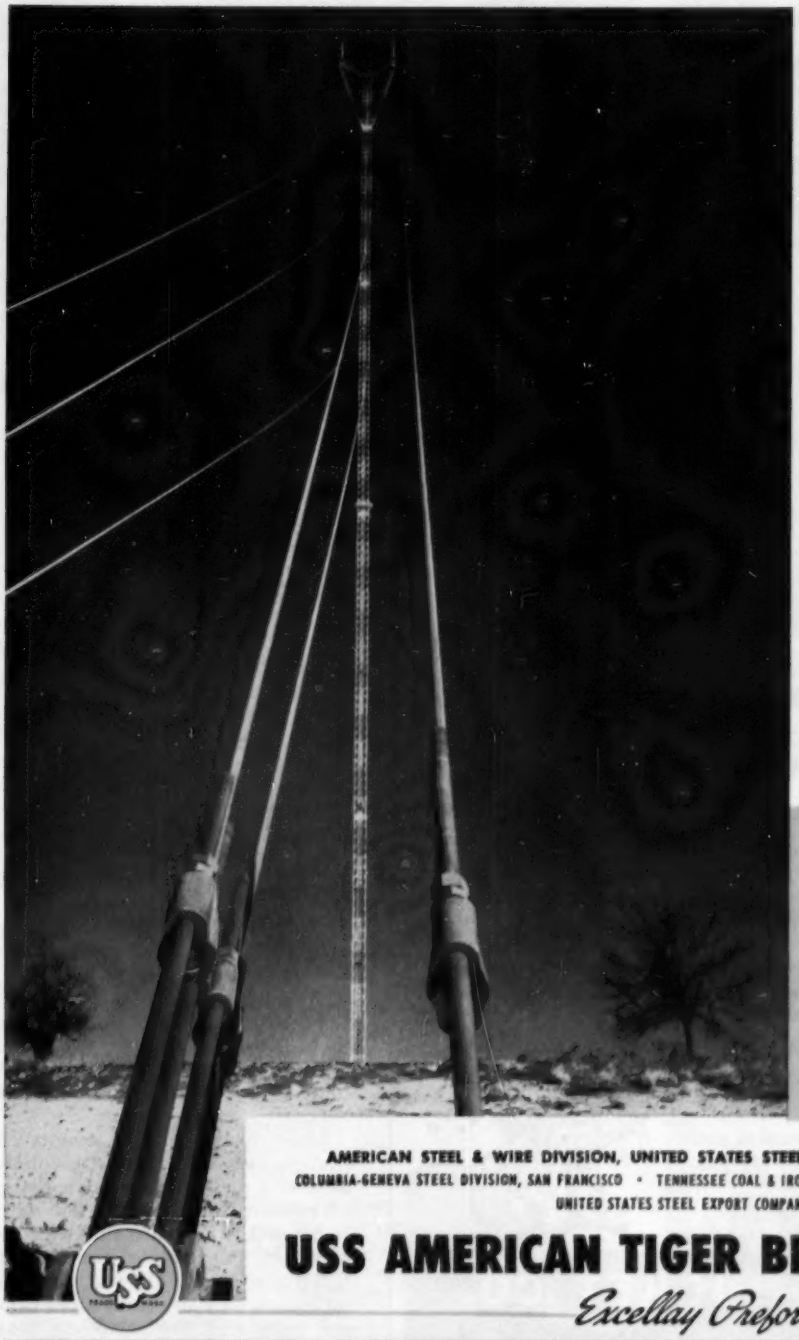
Whether stored indoors or outdoors, tires have to be guarded against excessive light and dirt. Indoor store rooms should have their windows painted black. Doors and other opening should be kept shut as much as possible.

To sum up, when choosing an indoor storage area—the best place to store rubber when conditions are right—see that it is dark, clean, dry but not hot, and away from petroleum products and electrical devices.

Even when these conditions are taken into consideration, tires stored indoors should be covered with heavy building paper or a tarpaulin to help keep them dry and clean. Also, if the floor cannot be properly cleaned of dirt or oils, tires should be laid on a foundation of clean ½ to ¾-in.-thick wood strips. This is also a good idea when the floor has been waxed.

Continued on page 208

Strong guys protect Tallest TV Tower in Texas from 155-mile winds



38,682 feet of American Tiger Brand Guy Lines are used to hold up the new Dallas TV Tower which is 1,521 feet high. It tops the Empire State Building by 49 feet.

To design the double-antenna tower to withstand extreme wind velocities of 155 miles per hour was a tough engineering problem. This was solved by supporting the tower with 30 Tiger Brand Galvanized Guy Lines ranging in size from 1⅜" to 2" in diameter. The strongest guy lines are designed to withstand pulling stresses up to 245 tons. They are anchored in concrete—some as far as 1050 feet from the tower.

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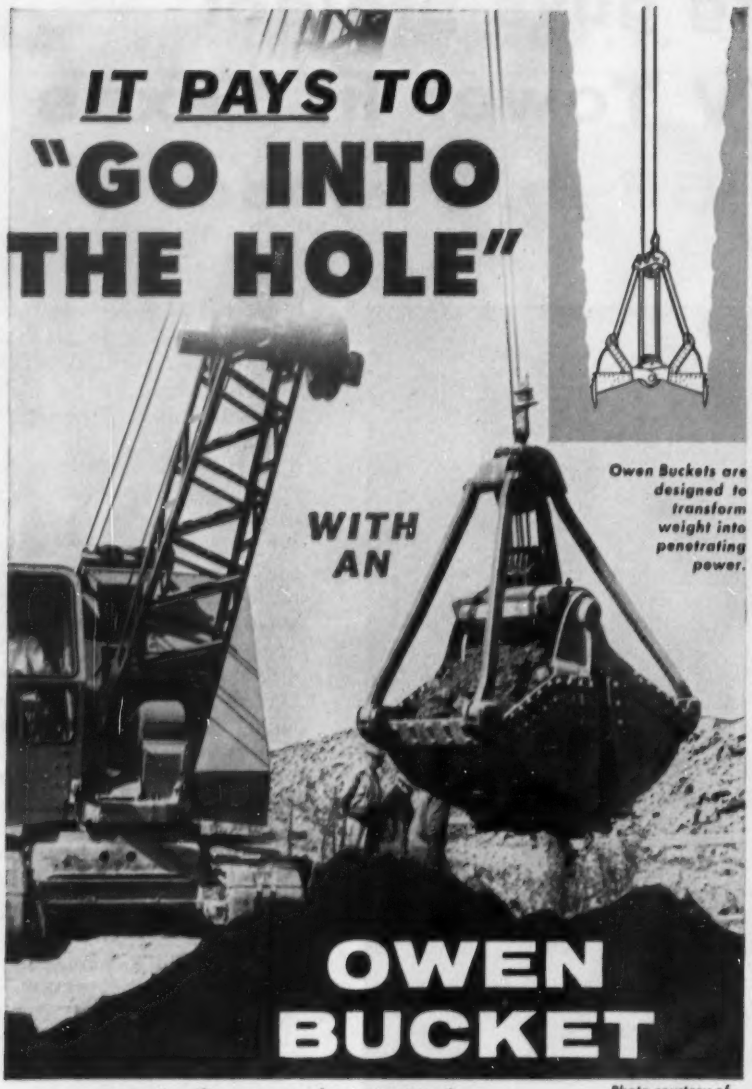

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MAINTENANCE SHOP . . .
Continued

Tires that must be stored outdoors should be covered with heavy canvas or a similar weatherproof material, LeTourneau - Westinghouse advises. Under no condition should they be stored directly on the earth. Wood foundations, similar to those for indoor storage, are best. Incidentally, while painting stored tires may improve their appearance, that's about all it does accomplish. It does little to prevent rubber deterioration.

Another thing to remember, whether stored indoors or outdoors, is that tires should not be piled so high that the bottom tires are crushed. And when storing mounted tires, don't pile them as high as unmounted tires because of the additional weight. When mounted tires are being stored, it is wise to reduce the air to half of the normal operating pressure.

Speaking of mounted tires, if a vehicle is to be kept out of operation for any length of time it should be jacked up and blocked so that the weight of the vehicle is taken off the wheels. Then reduce the air in the tires to 50% of normal operating pressure.

As far as tubes are concerned, LeTourneau - Westinghouse says that many of the same precautions outlined above should be followed to keep them dry, cool, draft-free, and away from petroleum and electrical devices. Tubes should be kept in their original packages until they are needed, and under no conditions should they be inflated while in storage. This is a practice that some contractors follow for fear that kinks or cracks will develop if they attempt to fold them.

When storing used tubes, remove them from the tires as soon as possible and completely deflate them by removing the valve cores. Fold tubes carefully and do not pile them so high that their weight will cause harmful creasing along the folds of tires at the bottom of the heap.

Light, heat, moisture, over-ventilation, ozone, oil and gasoline, dust and dirt are natural enemies of rubber, but they are not hard to combat if tires are stored properly. If the simple precautions listed above are followed, there is no reason why tires and tubes cannot be stored for relatively long periods of time without endangering their work life.

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B-195

Contractor-Labor Relations . . .

by LEON B. KROMER, Jr.

Thorough Preparation Pays Off

This is the fifth in a CM&E series of articles on how to prepare in advance for your next collective bargaining session.

A CONTRACTORS' NEGOTIATING COMMITTEE sits across the table from a union committee usually composed of the business agent, one or more officers of the local, and selected individuals from the membership of the union. Behind these union men is a staff of economists, statisticians, and experts employed by the international union. It is their job to funnel information continually to each local union bargaining committee. The union committee will have a lot of information readily at hand. This can, and often does, put contractors' committees at a disadvantage from the start of negotiations.

To offset this disadvantage here are some "do's and don'ts" to remember as you bargain.

"Do's"

Establish close liaison between yours and all other contractors' committees bargaining with unions in the locality so that you know what proposals contractors are making, what unions are demanding. This information, together with any contract settlements, is essential to successful bargaining.

It is important that your liaison extend to adjacent areas and, if possible, to a major part of your state. You can count on the union committee citing any settlements in the state that it feels are favorable to the union. Patterns of wage adjustments often are set by such techniques. Cooperation between contractors' groups in cities located in the same state should be such that as soon as one committee reaches agreement with its union, other committees negotiating with locals of the same international union know of the settlement. If it appears to be high, there are often reasons which are important to know.

Determine which member of your committee is to act as major spokesman before you sit down with the union. It is his job to lead off the discussion for the contractors. He need not necessarily be the chairman; it may be that the chairman knows all the answers when it comes to running a job but can't drive the best bargain in negotiations. When firmness is required, it is preferable to have a spokesman who is not excitable or quick tempered, but who can state the position of the contractors clearly and concisely. This does not mean that other members of the committee must sit back and let the spokesman carry the ball alone. They also must participate in the negotiations if only to back up their spokesman.

Agree before sitting down with the union committee that no member of your committee will speak up to approve a union proposal. It is absolutely essential to the success of your bargaining that the committee as a whole examine each union proposal before any is approved. Each member is bound to safeguard the interests of all. None has the right to agree impulsively to a union proposal in open meeting. It may not affect him, or he may not understand it fully.

If a member thinks the contractors can agree to a proposal and possibly gain one of their own, he can suggest a caucus. Then the two committees will separate to discuss the issues privately. During such sessions proposals can be examined, language changed to clarify, or the point rejected for one or more reasons. When the committees come together again, the contractors are in agreement.

Sit down as a full committee of contractors for a discussion before each meeting with the union committee. It is preferable that these meetings take place immediately before you meet with the union. Review major issues brought up at the previous meeting, and discuss all points thoroughly. This often brings out "angles" that were not apparent. At these meetings decide on the approach that you will take in the negotiations and be sure every member understands.

Arrange meetings of the chairmen of all committees negotiating with the building trades unions in your area. This frequently can be arranged through various contractors' associations. These meetings provide an important forum for the exchange of information as negotiations proceed. And sometimes it is possible to agree on a united stand on any demands being made to all committees. It was at this type of meeting in one area that plans were laid to make all travel expense clauses in local agreements uniform. During subsequent negotiations, this was accomplished.

Get it down in writing! As soon as negotiations have been completed, write out everything that has been agreed to by both sides and have each member of both committees sign. This is called a "Memorandum of Agreement." It should spell out all changes to the existing agreement. And it should show the date the agreement was reached and the effective date of changes. An executed copy is given to the chairmen of both committees. As soon as possible have all changes incorporated into the existing agreement and distribute copies to all contractors in the area employing members of that trade.

Inform all other contractors' committees as well as contractors affected by the new agreement as soon as possible. Make sure that all contractors understand the nature of the changes. This can avoid confusion and expensive mistakes. Ignorance of the terms of a new agreement can lead to unnecessary and costly labor troubles.

"Don't's"

Don't arrange for negotiating meetings to take place in the office of some contractor. If there is a contractors' association and its headquarters has adequate space, meetings can be held there. Otherwise, choose a neutral spot.

Don't have meetings timed to start in the evening. Many contractors and unions do plan negotiations to start at this time as a matter of convenience to both. However, psychologically, this is probably the worst time of day to discuss controversial issues and hope to reach agreement. Everyone is at his lowest ebb mentally and physically, and tempers often are short. If possible, meetings should be held in the morning with a break of at least an hour and a half for lunch. Apart from being

Cold facts about buying fuels, motor oils and greases

Why Standard Oil can serve

Got a construction job in the Midwest or Rocky Mountain states? Bidding on one? Already working a job? Then read how you can get better service and better fuels, lubricating oils and greases.

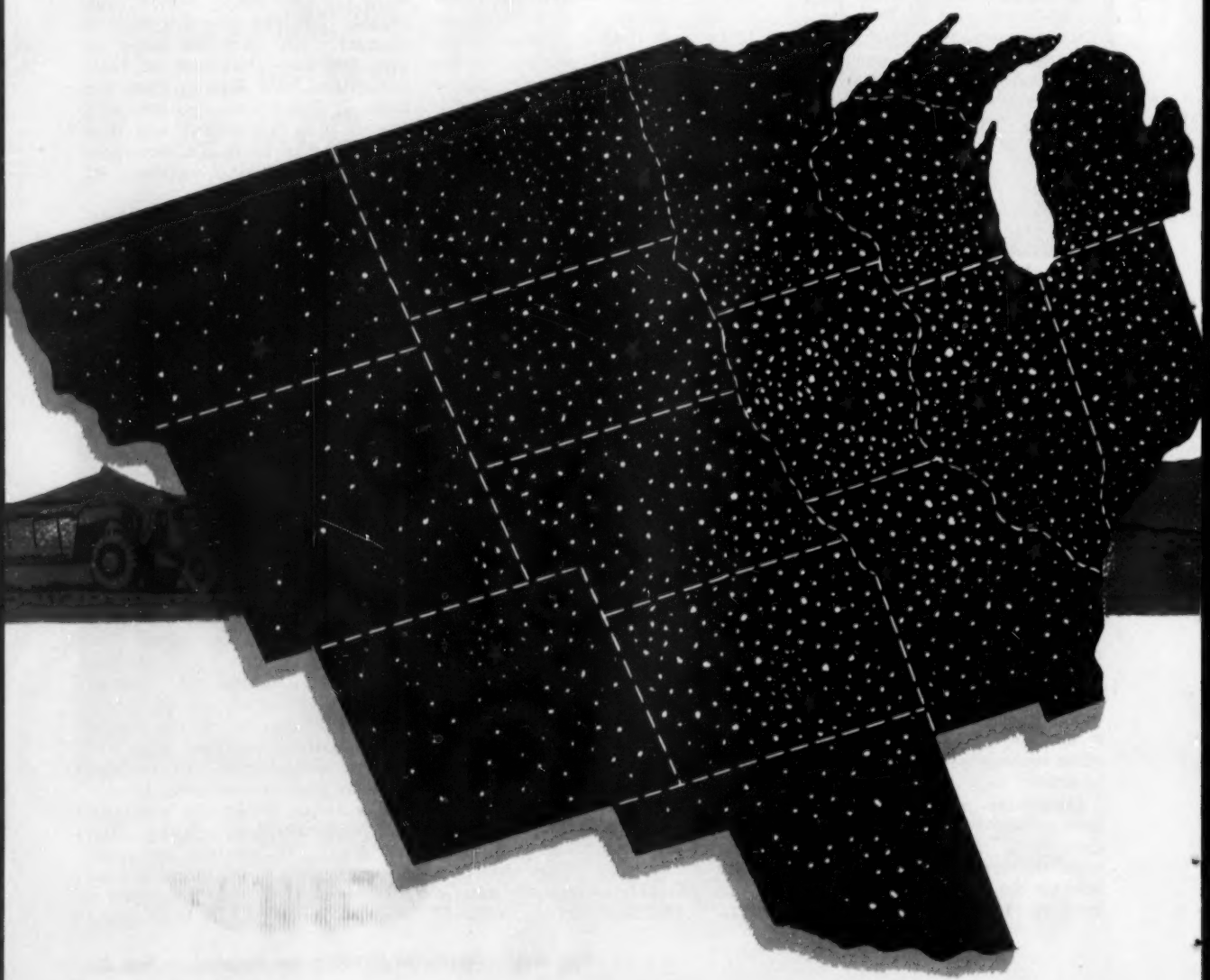
How you get service on the job.

In the 15 Midwest and Rocky Mountain states there are more than 3,900 Standard Oil bulk plants. With this many plants, none can be more than a few miles from your job no matter where it is. Experienced men work out of these bulk plants to see that you get on-the-spot service. They see that you are supplied day and night. If you work two shifts or even three, they may too.

In addition, there are 23 Standard Oil division offices in the 15 states. In each office there is a chief automotive engineer and a staff of automotive lubrication specialists. All of these men are qualified to give technical service. Most of the men have engineering degrees. They have received extensive training in Standard Oil's own Automotive Sales Engineering School. *All of these men are* Standard Oil *employees.*

The kind of service you get from STANDARD.

Automotive lubrication specialists from Standard division offices will survey your equipment and



you better

recommend the fuels, motor oils, greases to use. They will help you set up a preventive maintenance program and suggest lubrication schedules. They will back this up with service from the Standard Oil bulk station so that your equipment is *never* idle for lack of petroleum products. Through them you have a direct line to Standard Oil headquarters and laboratory for additional help.

Why STANDARD OIL products are tops for construction equipment.

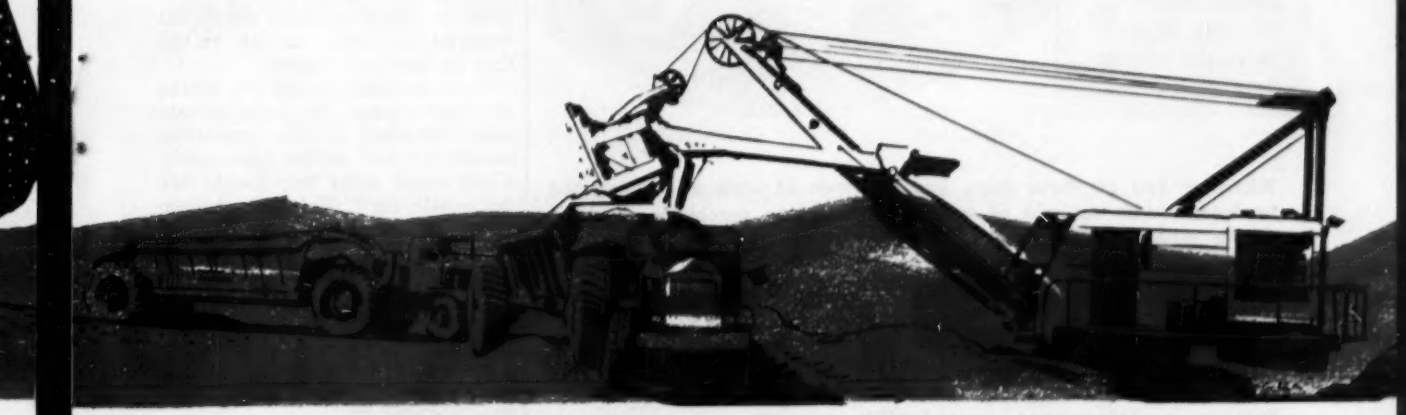
Standard Oil lubricants, fuels and greases are approved by equipment manufacturers. But there's more to it than just that. Most big equipment manufacturers' plants are right here in the Standard Oil territory. Standard works closely with these manufacturers, knows what's needed of the fuels, motor oils and greases used in construction equipment. Standard Oil fuels, lubricants and greases are used by many manufacturers in initial fills and lubrication. All products equal or exceed specifications of the manufacturer. They will stand up to any job you give them with plenty to spare.

Refinery to you, it's all STANDARD.

All Standard Oil fuels, lubricating oils and greases are made by Standard and delivered to you by Standard Oil employees with Standard's own distribution system. Everywhere you go in the Midwest and Rocky Mountain states there is a *Standard Oil* owned and operated bulk plant within a few miles. You deal with one company. Every Standard Oil supply point is equally and uniformly well run.

How to get in touch.

Because Standard Oil lubrication specialists so thoroughly cover their territory, you can depend upon meeting your man at any important contract letting —if you haven't already met him. If you miss him, look in the telephone directory of any town—no matter how small—nearest your job. You'll find the Standard Oil bulk plant listed under the Standard Oil name. If you still miss, sit tight, the Standard Oil man will be around to see you *before* you need him and he will be ready to serve you starting right then. If you would like more information right now, write or call Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.



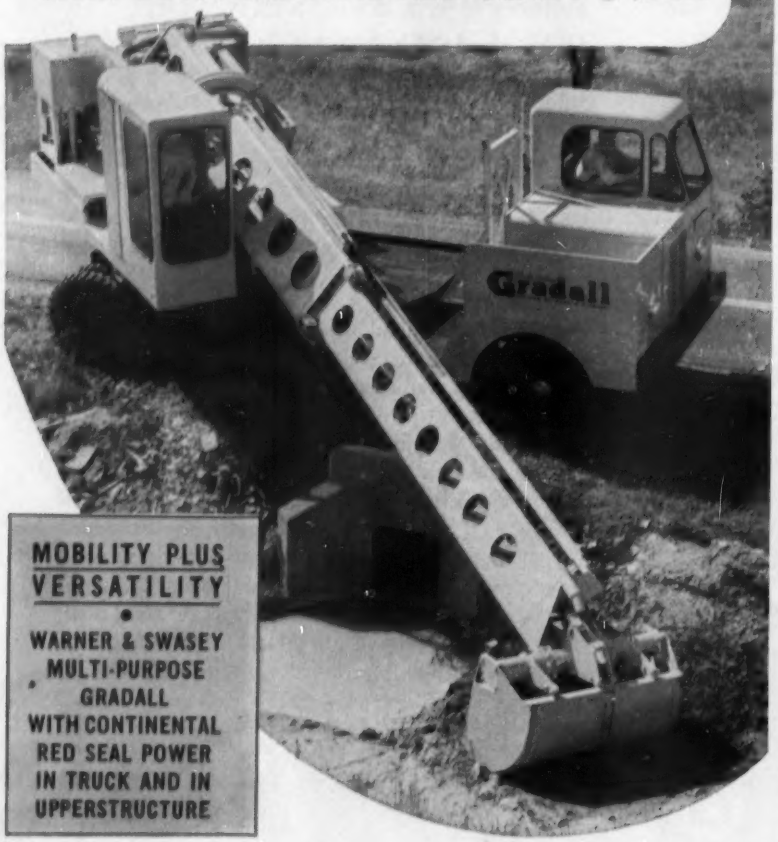
Standard Oil serves these Midwest and Rocky Mountain states

Colorado	Michigan	N. Dakota
Illinois	Minnesota	Oklahoma
Indiana	Missouri	S. Dakota
Iowa	Montana	Wisconsin
Kansas	Nebraska	Wyoming

STANDARD

STANDARD OIL COMPANY (Indiana)

Changing the Face of the World with CONTINENTAL RED SEAL POWER



MOBILITY PLUS VERSATILITY

•

WARNER & SWASEY MULTI-PURPOSE GRADALL WITH CONTINENTAL RED SEAL POWER IN TRUCK AND IN UPPERSTRUCTURE

Wherever you go these days, you see men at work re-shaping the landscape with the aid of modern construction machines. And no matter what the specific job—clearing land, ditching for irrigation, grading for railroads and highways, laying pavement or wrecking buildings—you'll note a pronounced swing, of late, to equipment with Continental power. The adoption of dependable Red Seals—gasoline or Cushioned Power Diesel—by more and more builders of construction and industrial equipment, reflects a spreading recognition, on the part of machine users, of this basic fact: There's a vast difference, in performance, dependability, economy and upkeep cost, between the ordinary engine and the Continental Red Seal that's engineered and built for the job.

•

SERVICE FACILITIES AND RED SEAL PARTS AVAILABLE EVERYWHERE

CONTINENTAL MOTORS — Powerful as the Nation — AMERICA'S STANDARD

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6 EAST 45TH ST., NEW YORK 17, NEW YORK • 3017 S. SANTA FE AVE., LOS ANGELES 58, CALIF.
5215 CEDAR SPRINGS ROAD, DALLAS 9, TEXAS • 1232 OAKLEIGH DRIVE, EAST POINT (ATLANTA) GA.

a "7th inning stretch" this time should be used by the committee to go over what has been covered in the morning. It provides an opportunity to assess the union's demands. It may be that a member will want to consult other contractors. Take this time to do it by phone.

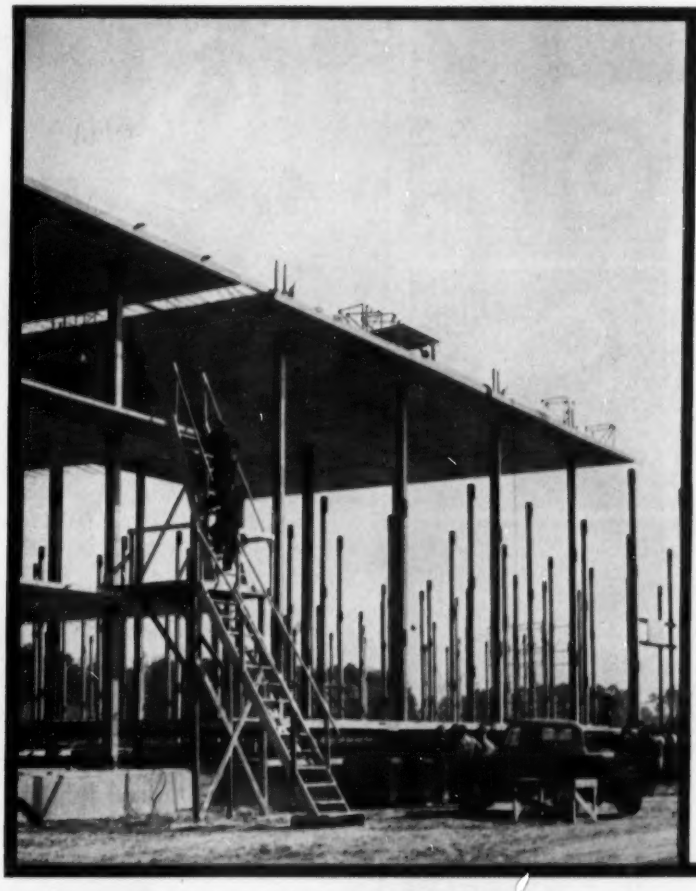
Don't go into a negotiating session with a chip on your shoulder or with the attitude that you are "out to get" the union this year. Chances are, with that approach, the union will "get you." In many cases union officials sitting on bargaining committees understand some of the problems confronting contractors and are willing to compromise. It is to your advantage to indicate the same attitude of conciliation. In a hard bargaining session, you should be reasonable but firm.

Don't lose your head during negotiations. Collective bargaining sessions are not the place for emotional pyrotechnics. No effective agreement ever came out of a battle of emotions. This does not mean that you can't or shouldn't raise your voice. Sometimes this is an effective technique to stop shouting and similar histrionics from the other side. But always maintain control of your temper. Anyone indulging in an emotional outburst is likely to say things that he later will regret.

Don't indulge, during the weeks of negotiations, in irresponsible talk. Members of the committee should not talk on the job or over a bar about what they think "we can settle for." This information often finds its way back to the union and can be very damaging to successful completion of negotiations. All information should be reported to contractors' meetings by the chairman of the committee and all questions on the status of negotiations cleared through him.

An Oversight

In our April issue, we unintentionally omitted the name of the subcontractor who designed, installed, and operated the unique wellpoint dewatering-recharging system at New York's Coney Island Houses. Wellpoint Dewatering Corp., New York, handled the job under the direction of vice president David A. Werblin.



Extra Value makes the difference in Contract Bonds

AN INDEMNITY BOND covered the contractor on this slab-floor dormitory built for U. S. Navy at Little Creek, Va.

INDEMNITY of North America is one of the leading independent markets for surety bonds. The extra value it gives is measured in . . . *Carrying capacity; Service* with agents and offices in principal cities of the free world; *Preferred rates* and *Prompt attention* for qualified contractors. For extra value in your bonding requirements see an INDEMNITY agent or your own broker.

One of the North America Companies which are headed by Insurance Company of North America, founded 1792

Protect what you have ©

INDEMNITY INSURANCE COMPANY OF
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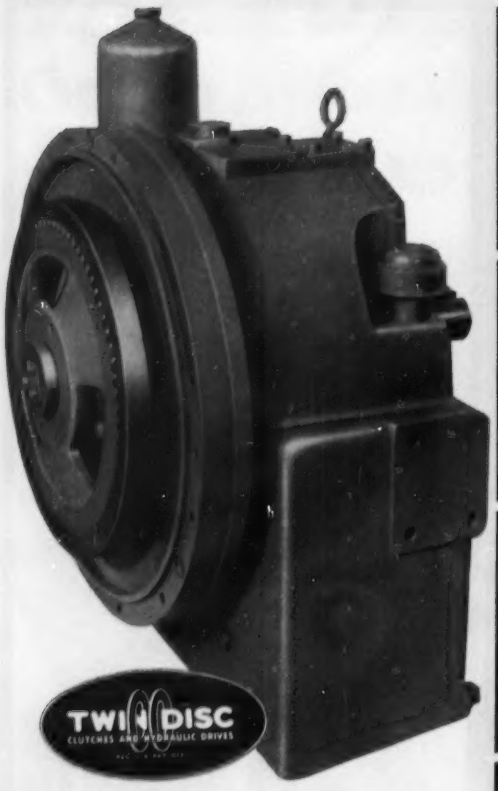
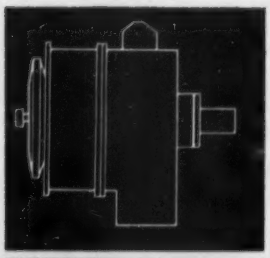
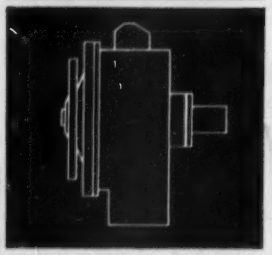
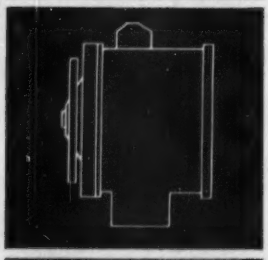
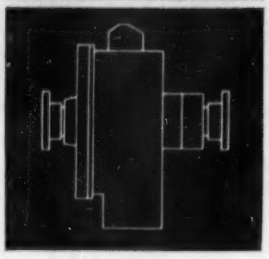










announces new

SINGLE-STAGE

Torque Converters

Here's another good answer to the power transmission problems involved in today's construction equipment—the all new Twin Disc *Single-Stage* Torque Converter.

The new single-stage torque converter is currently available in the 1500 Series, which is applicable to engines producing from 30 hp at 1150 rpm to 198 hp at 2400 rpm. Four models provide various input and output combinations.

Already time-proved by extensive field tests, this single-stage torque converter is ideal for use in shovels, draglines, front-end loaders . . . in all types of construction equipment requiring smooth, efficient, dependable torque multiplication.

This new Twin Disc Torque Converter will cut operating costs . . . boost profits . . . handle the toughest jobs with ease. The converter's smooth flow of power eliminates sudden load shocks between engine and driven equipment . . . cushions out harmful vibrations.

Specify a Twin Disc Torque Converter, single-stage or three-stage, in your next piece of construction machinery or when you repower your present equipment.

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

TWIN DISC
Torque Converters

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois
Branches or Sales Engineering Offices: Cleveland • Dallas • Detroit • Los Angeles • Newark • New Orleans • Tulsa

(Advertisement)

An ever-

to solve power

Torque Converters

One of the first major manufacturers to apply torque converters to construction equipment was Allis-Chalmers Manufacturing Company. This was back in 1940, when Allis-Chalmers introduced its Model HD-14-C Tractor equipped with a Twin Disc Torque Converter.

Soon after this new concept in power transmission was introduced, however, the requirements of World War II channeled virtually all heavy construction machinery into military use. It was during this period that torque converter-equipped tractors truly came into their own . . . to meet the difficult construction demands of the rapidly changing Pacific Theatre of Operations.

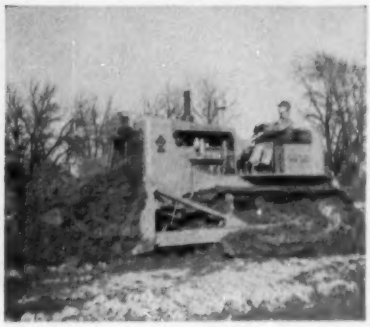
After World War II, the torque converter quickly proved its worth in civilian duty as it had in military service. Within a relatively short time, construction men everywhere were well aware of the increased efficiency . . . the increased production . . . the over-all savings that could be gained through torque converter drives in construction machinery.

The torque converter multiplies engine output torque exactly as needed (the Twin-Disc Three-Stage, up to six times at stall, if required)—consequently, harmful, costly engine lugging and stalling are eliminated. Shock loads and destructive vibrations are cushioned out—through fluid connection—and power is automatically matched to load demand.

News of these advantages quickly spread in the construction industry . . . and, within just a few years time, torque converters became a well-accepted feature in all types of construction equipment . . . in shovels, in tractors, in loaders, in off-highway equipment—wherever the many advantages of torque converters could be applied.

increasing trend to fluid drives

transmission problems on construction equipment



This torque converter-equipped crawler tractor receives a smooth, flexible flow of power — enabling it to do more work in less time. The converter in this particular tractor incorporates Twin Disc Three-Stage Torque Converter components.

Fluid Couplings

Along with the rapid acceptance and the increasing demand for torque converter drives in construction equipment, a wide choice in other fluid drives became available through use of the fluid coupling. This fluid drive provides the shock-cushioning and the overload protection of torque converters but is for applications *not* requiring torque multiplication.

Like Twin Disc Torque Converters, Twin Disc Fluid Couplings transmit power through fluid, absorbing shock loads and harmful vibrations. Their chief advantage is for those applications to construction equipment with hard-to-start characteristics and where the engine must operate at its most efficient speed and output. Efficiency of fluid couplings is high, with a maximum "slip" of only 4% at normal operating speed and power output.

Conveyors, crushing equipment, winches, vibrating screens, cranes — these are just a few of the many types of equipment used in the construction industry that profitably incorporate Twin Disc Fluid Couplings.

A favorite type of fluid drive with construction men is the Twin Disc Fluid Power Take-Off. For this reason, manufacturers like The Thew Shovel Co. have offered this fluid drive as standard for many models of their products for many years. The Twin Disc Fluid Power Take-Off mounts directly on the engine flywheel housing, making an efficient, economical, compact power package for shovels, draglines and other powered machinery.

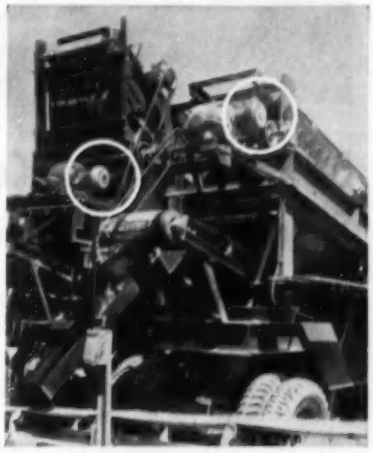
Another commonly used fluid coupling is the Twin Disc HYDRO-SHEAVE® Drive. This unit combines the advantages of a fluid coupling and a sheave for V-belt drive — in a single, unusually compact package. It is available for engines and motors producing from ¾ to 50 hp.

A Complete Line

First to introduce the torque converter to this country, Twin Disc has maintained its leadership in the industry through the ensuing years. Therefore it's not surprising that the latest announcement of interest to construction men also comes from Twin Disc. It is a new line of *single-stage* torque converters. Currently available are the 1500 Series models for engines producing from 30 to 198 hp. Development of additional sizes of single-stage torque converters is in progress and their availability will be announced shortly.

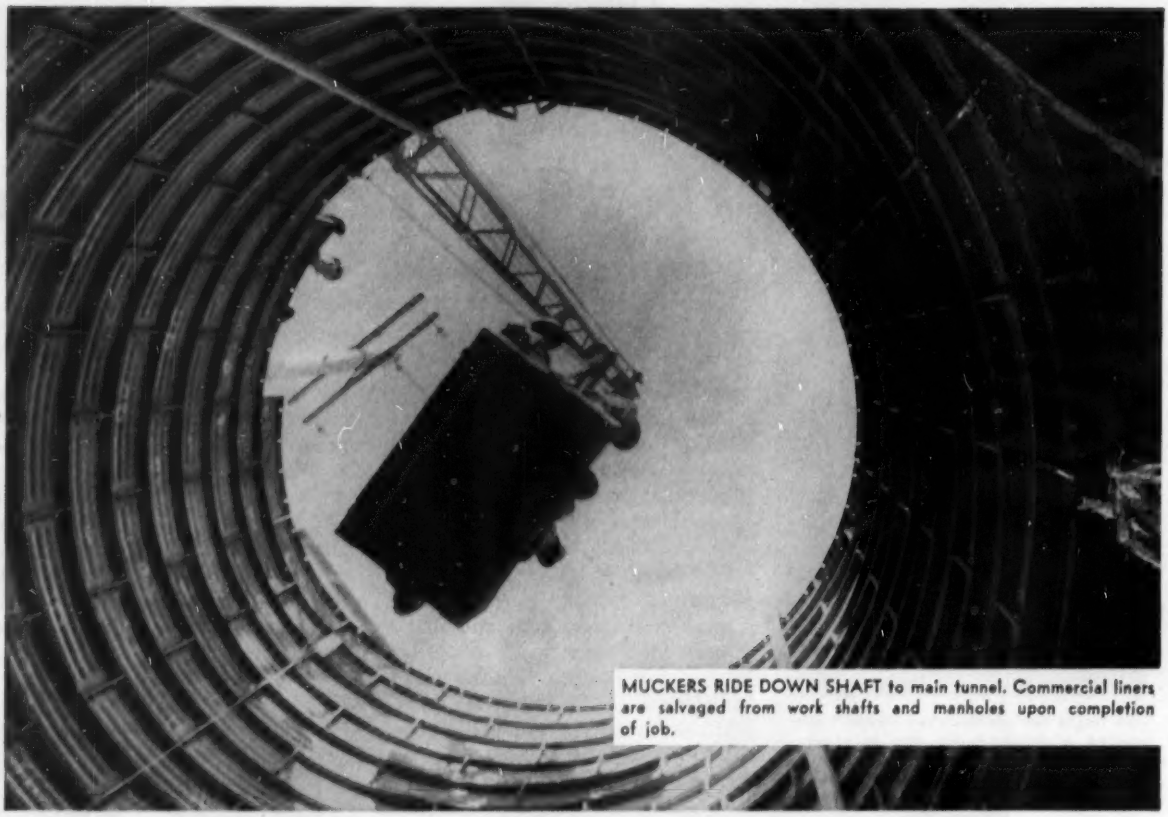
This power shovel is a typical application of Twin Disc Fluid Couplings on construction equipment. It benefits from the shock-cushioning characteristics of a Twin Disc Fluid Power Take-Off.

In addition to the most complete line of *fluid* drives available, Twin Disc also offers a complete line of friction clutches — and recommends these drives when they are best suited to a particular piece of equipment on a particular job. For example, Twin Disc Friction Clutches may be found on portable compressor units, mobile cranes, pumping units—in all heavy-duty construction applications where friction-type clutches prove most advantageous.



This vibrating screen works through another Twin Disc Fluid Coupling, the HYDRO-SHEAVE® drive. By picking up heavy starting loads smoothly and evenly, the HYDRO-SHEAVE protects both driving and driven equipment.

Yes, wherever you find construction equipment—from New York to Calcutta, from Seattle to Melbourne —you'll find Twin Disc Fluid *and* Friction Drives at work, solving the really *tough* problems involved in *proper* power transmission for construction equipment.



MUCKERS RIDE DOWN SHAFT to main tunnel. Commercial liners are salvaged from work shafts and manholes upon completion of job.

Inside Bolting of Commercial Liner Plates and Ribs Speeds Sewer Tunnel to Early Completion . . .

• A major factor in the speedy construction of the Central Schuylkill East Side Interceptor System of Philadelphia is the use of Commercial steel liner plates and posts.

Four thousand eight hundred feet long and averaging thirty-five feet below the surface, this tunnel passes under railway lines and heavy city traffic . . . demanding roof support of maximum strength.

To provide the needed strength, safety, ease of handling and simplified installation, Commercial Shearing steel liner plates and posts were installed. Bolted from inside the tunnel with only a "spud wrench," Commercial liner plates and posts could be installed faster than any other support, even by unskilled work crews . . . an important safety factor when working in unpredictable earth and rock formations.

Commercial steel liners bent to suitable radii for tunnels or shafts four feet or larger in diameter, are available in thicknesses 1/8" to 3/8". For complete details on how you can cut days off your tunnel completion schedule, write to Dept. B-18. The Commercial Shearing and Stamping Company, Youngstown, Ohio.

HEADING AND BENCH TUNNELING—removing hard bench, muckers move ahead. Commercial combination radii liner plates are in place in soft top heading.

MIXED FACE TUNNEL SUPPORT—liner plates holding unstable ground in top heading are pinned and supported on steel posts bearing on stable ground.

COMMERCIAL shearing and stamping

YOUNGSTOWN, OHIO
CHICAGO, ILLINOIS
SALT LAKE CITY, UTAH

Construction Men in the News . . .

AGC Transfers Executive's Duties

H. E. FOREMAN (left), managing director of the Associated General Contractors of America since 1940, will limit future activities to consulting and advising on high level policies, trends, and economic developments. Recently ill, he is not able to resume in full the activities and responsibilities required of the chief executive.

Executive responsibility for management of the association has been turned over to **JAMES D. MARSHALL** (right), executive director. Marshall will retain his present title, and Foremen will continue as official managing director, AGC officials said.

Other staff appointments also were made. **WILLIAM E. DUNN,** manager of the labor department, was named assistant executive director. **CHARLSON I. MEHL,** administrative assistant, was named administrative secretary.

Marshall has been executive director of the AGC since 1953. He previously had been assistant managing director since 1940. A native of Red Lake Falls, Minn., Marshall started in the electrical business in Minnesota and Denver. After a number of years with Northwestern Electric Equipment Co. of St. Paul, he became vice president of Peerless Electric Co. in Minneapolis and president of Minneapolis Electric Equipment Co.

He was president of the Minnesota Electrical Contractors Association; chairman, Minnesota section, American Institute of Electrical Engineers; and a member, Governing Board, Minnesota Federation of Architectural and Engineering Societies.

Marshall first became a part of the AGC in 1925 when he became manager of the Minnesota organization. He left the position in 1934 to come to Washington as manager of AGC's heavy construction and railroad contractors division. He assisted in setting up construction codes under the National Recovery Administration. He later became secretary of the AGC labor committee and, during World War II, helped to organize and was an employer member of the Wage Adjustment Board for the Building and Construction Industry. He did a similar job with the Construction Industry Stabilization Commission during the Korean emergency. He was one of the founders of the National Joint Board for the Settlement of Jurisdictional Disputes, of which he now is secretary.

THOMAS J. WALSH JR., president of the Walsh Construction Co., is the new president of The Moles, an association of tunneling and heavy-construction engineers and executives. He was elected at this month's annual meeting of the association. Walsh succeeds **A. HOLMES CRIMMINS,** treasurer of the Thomas Crimmins Contracting Co.

Other officers elected were **RICHARD A. JOHNSON** of the Arthur A. Johnson Corp., first vice president; **GILBERT M. SERBER** of Stock Construction Co., re-elected secretary; **RICHARD M. JOHNSEN** of The Foundation Co., treasurer, and **R. E. SAVAGE** of Northwest Engineering Co., sergeant-at-arms.

FORREST W. PARROTT, former national president of the Associated General Contractors, has announced his retirement as president of the C. F. Lytle Co. of Sioux City. A reorganization of the firm's officers followed. At a meeting of the board of directors the following new officers were named: **F. K. LYTLE,** president; **C. F. LYTLE,** vice president; **H. L. RICE,** vice president, secretary and treasurer; **WILLIAM H. DEBUTTS,** vice president and assistant secretary; **E. C. PETERSON,** assistant secretary and assistant treasurer; **K. R. MOSHER,** assistant secretary and assistant treasurer.

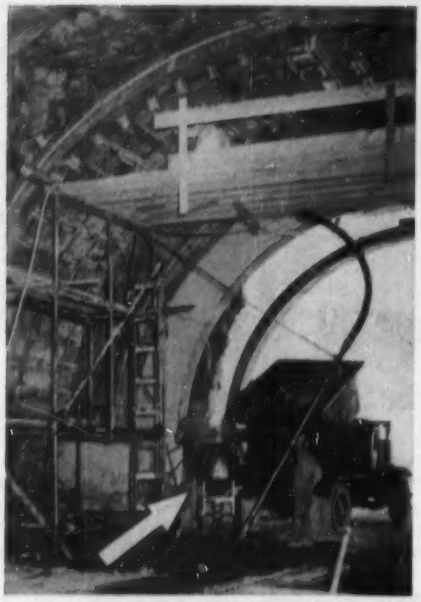
Parrott became associated with the Lytle company in 1921. He was then auditor for the Iowa State Highway Commission. Since that date he has served as secretary, vice president, and has been president of the company for the last 10 years. Parrott served as vice president of the Associated General Contractors of Iowa and as president for one year. He was elected national president in 1947. He currently is serving on three national A.G.C. committees.

THOMAS J. GRASSO has been named vice president-general superintendent, and **SAMUEL C. FLORMAN** is new chief estimator of the Kreisler-Borg Construction Company, New York general contractors.

Grasso came to K-B after 17 years of field supervision with such firms as Psaty & Fuhrman, Inc., J. Rich Steers, Inc., and Industrial Engineering Co., all of New York. During World War II he served overseas with the U. S. Army.

(Continued on next page)

There's NO *substitute for good* JOB PERFORMANCE!



Precast Rings eliminated shoring and supported forms for lining the 280 ft. long tunnel in Mt. Ranier National Park. Then a

PREHY GROUTER & PLACER

speeded construction on MT. RAINIER TUNNEL

by placing concrete rapidly through openings in suspended forms. The equipment on this job was lighter and resulted in considerable savings in construction time, as compared with cast-in-place lining. Construction story ENR Dec. 22, 1955.

There is a type of Prehy Grouter and Placer for every job. Pressures from 15-125 psi.

Write for literature.

PREHY CO. 420 LEXINGTON AVE. NEW YORK 17, U.S.A. *Telephone:* MUrray Hill 3-5568

NO WEIGHT LIFTING!

Only 1/5 of load is carried by the barrow man

Why be a weight lifter when Sterlings are available to carry the brunt of the load? The perfectly balanced construction of Sterling Wheelbarrows permits 80% of the load to be carried on the wheel . . . only 20% is carried by the barrow man. And smooth-running, anti-friction bearings make the load seem even lighter. The saving in muscle power increases job efficiency. Crews work faster, make more trips per day. Actually, you'll find Sterlings cost less per year.

Write for catalog.

STERLING WHEELBARROW CO., Milwaukee 14, Wis.

Look for this Mark of STERLING Quality

Sterling WHEELBARROWS

CONSTRUCTION MEN . . .
Continued

Florman came to K-B from Joseph P. Blitz, Inc., of New York, where he was project manager and estimator for apartment house, school, and office building construction. During World War II he served with the Civil Engineer Corps of the U.S. Navy on advance base construction in the Philippines, Truk, and other Pacific Islands.

COLONEL GUNNARD W. CARLSON, now with the 6th Armored Division, Fort Leonard Wood, Missouri, will become Resident Member, Board of Engineers for Rivers and Harbors, at Washington, D.C. He will succeed **COLONEL HUBERT S. MILLER** who is retiring from active service. The Board is comprised of seven officers of the Corps of Engineers. Its purpose is to review reports on proposed federal projects involving navigation, flood control, and related work.

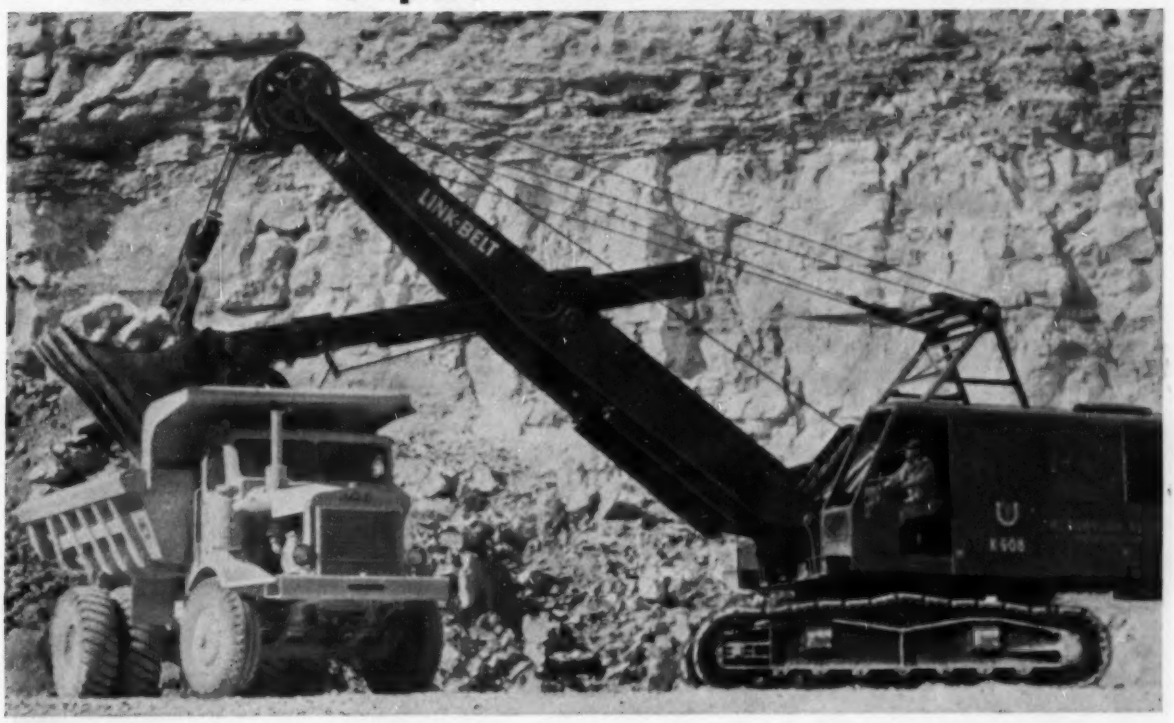
COLONEL JOHN B. W. COREY JR., is the new District Engineer for the Armp Corps of Engineers at Chicago. He succeeds **COLONEL PHILIP F. KROMER,** District Engineer since 1953. Kromer has been assigned to the United States Army Forces, Far East, for duty in Japan.

COLONEL EDWARD D. COMM, deputy chief of staff for plans and logistics operations, U.S. Army, Europe, is new District Engineer at Louisville, Kentucky. Comm succeeds **COLONEL WILLIAM D. MILNE,** district engineer since 1953.

Comm has served as staff officer in Washington, D.C., and overseas, in the North African, Mediterranean, and European Theaters.

EDWARD W. KILPATRICK, chief engineer of the New Jersey State Highway Department since 1950, has retired from state service. The vacated post will be filled temporarily by **OTTO H. FITZSCHE,** acting chief road engineer. Kilpatrick came to the highway department in 1942 as liaison agent. In 1944 he was named assistant state highway engineer by Commissioner Spencer Miller, Jr., and in 1950 received his appointment as state highway engineer. He served as acting commissioner during an illness of former commissioner R. J. Abbott.

It's time to compare . . . with LINK-BELT SPEEDER



Now Link-Belt Speeder gives you "small rig" speed in a

new 3-yd shovel-crane

Here's the K-608 with true power hydraulic controls. It's faster . . . more agile and mobile . . . easier to handle than many machines half its size!

THE only machine in its class offering true power hydraulic controls—the K-608 responds quickly, precisely, positively to a touch of its operator's fingertip. It all but eliminates operator fatigue, boosts output by up to 25% or more!

Furthermore, the way a K-608's power follows the load is all but unbelievable. That's because a torque converter and tailshaft output governor (standard) automatically and perfectly match engine output power to the load. You get heaping dippers in a hurry, save needless wear on the power train, cut fuel costs.

And, the K-608 is precision-made of quality components with plenty of stamina to stand up under continuous use of great usable horsepower. It's designed to cut downtime, too. Clutches are hydraulic actuated, automatically compensate for heat and normal lining wear.

Every day you don't have a K-608 on the job is costing you substantial extra output. One look will convince you. So why not call your distributor right now. Ask him where you can see a K-608 at work. Link-Belt Speeder Corporation, Cedar Rapids, Iowa. 14.081

LINK-BELT SPEEDER

Builders of a complete line of crawler and rubber-tired shovel-cranes

CHECK THIS BRIEF LIST OF THE OUTSTANDING K-608 ADVANTAGES

- 75 TONS RATED LIFTING CAPACITY
- GREATER OUTPUT. Torque converter and engine are matched for greater production during digging cycles.
- MORE LIVE WEIGHT because extra strength and heft built into every component eliminates need for excessive "dead" counterweight.
- ALL-WELDED, STRESS-RELIEVED UPPER AND LOWER FRAMES increase machine life.
- POSITIVE INDEPENDENT CHAIN CROWD
- HYDRAULIC-ACTUATED, SELF-COMPENSATING CLUTCHES minimize downtime for frequent hair-line clutch adjustment.
- EXCEPTIONAL GROUND CLEARANCE.
- FREE-SPOOLING DRUMS mounted in anti-friction bearings allow greater free rolling action with minimized power loss . . . positive alignment makes smoother braking, clutching.

NEW CATALOG

on the K-608 is yours for the asking. Get it from your distributor or write direct. Ask for catalog 2552.

Flexible Homoflex Hose Takes Rough Handling!

Homoflex Hose offers a combination hard to beat for rugged use. It is engineered to provide maximum flexibility and light weight for easy handling—yet it's rugged and strong to take a beating when it has to be handled roughly on the job. That's why users specify Homoflex for use with air tools, or wherever heavy duty hose is required to handle air, water, and other fluids and gases.

"As flexible as a rope," workers on the job say, because Homoflex Hose coils and uncoils freely in any direction. This mandrel-made hose has no pre-set twist. It resists kinking and eliminates the internal strain that can lead to hose rupture. Specially designed super-strength cord braid is precision applied at just the right angle to permit the rubber tie-gum to completely penetrate and bond the braided plies during vulcanization. This homogeneous inseparable tube-to-cover bond gives Homoflex its extreme flexibility, strength and long durability. Its uniform inside diameter makes easier the fitting of couplings and insures faster flow. Homoflex Hose cuts hose costs because it gets more work done and it lasts longer.

Ask the R/M representative about easy handling Homoflex Hose for your operations. He can also show you advantages of new burst resisting Super-Master BW Hose, the extra heavy duty braided wire inserted construction for high pressure air, water and steam service. General service or special duty, there's an R/M hose engineered for your operations . . . to give you "More Use per Dollar."

RM642

R/M

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Brake Linings • Brake Blocks • Clutch Facings Asbestos Textiles • Packings • Engineered Plastic, and Sintered Metal Products • Laundry Pads and Covers • Bowling Balls

Sales and Service

Equipment purchasing and servicing takes less time when you know who and where to call. Keep advised of new distributors, sales personnel and other activities.

Distributors

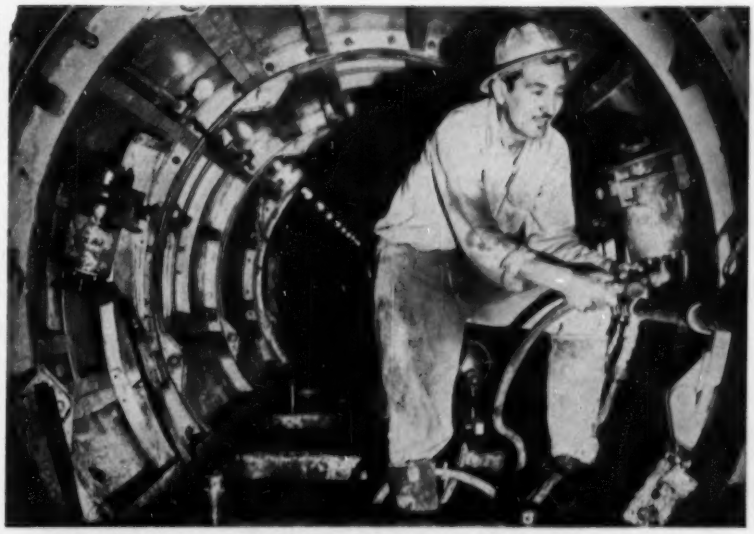
Baldwin-Lima-Hamilton Corp.: Three distributor appointments were recently announced by B-L-H Corp.'s construction equipment division. Mineco, Inc., Bartow, Fla., has been named distributor for Lima shovels, cranes, draglines, and pull shovels in the central portion of Florida. Southern Equipment Sales, Inc., Jackson, Miss., will handle the same products in the southern half of Mississippi. Hall-Perry Machinery Co., Butte, Billings, and Great Falls, Montana, will cover the state of Montana with the exception of Lincoln, Mineral and Sanders counties. Hall-Perry is also distributor for Austin-Western crushing equipment.

Baker-Raulang Co.: W. W. Monroe Co., St. Louis, have been appointed a distributor for Baker-Raulang's line of industrial materials handling equipment, including gas, electric, and gas-electric fork and platform trucks, the Shoveloader, and the Traveloader side-loading fork truck. Monroe's territory includes southern Illinois and eastern Missouri as well as St. Louis.

Worthington Corp.: Pearce Equipment Co., Inc., with offices in Houston, San Antonio, and Corpus Christi, has been appointed exclusive distributor for Worthington compressors, pumps, truck mixers, and air tools in the Gulf Coast and south Texas area.

Euclid Div., GMC: J. W. Bloomquist, domestic sales manager, has announced the appointment of Tobin Tractor Co., Regina, Saskatchewan, Canada, as authorized dealer for the province of Saskatchewan. The company will handle the complete Euclid line, including scrapers, rear and bottom-dump hauling units, and crawler tractors.

Chain Belt Co.: The construction machinery division has announced the appointment of the Illinois Tractor Co., Mt. Vernon, Ill., as distributor of Rex construction machinery. The new distributor will cover the part of Illinois east of and including Bond, Clinton, Washington, Perry, Jackson, Union and Alexander counties, and the counties south of and including Marion, Clay, Richland, and Lawrence. Another



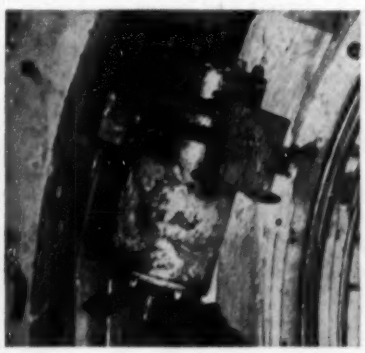
WORKER OPERATES one of the two Viber external form vibrators used on 2.9 mile sewer tunnel job. Vibrators are clamped to form and moved forward as concrete slope advances.

Two Movable External Vibrators Consolidate Concrete in La Cienega And San Fernando Relief Sewer

MAJOR PROBLEM of congested sewers in Los Angeles' heavily populated San Fernando Valley is being alleviated by a 2.9 mile long sewer tunnel bored through the Hollywood Hills.

The La Cienega and San Fernando relief sewer tunnel was holed through in horseshoe shape with a minimum diameter of 7 ft. 9 in. During lining, it was made circular with a 6 ft. diameter. Kemper Construction Company, Los Angeles, headed lining operations.

The Kemper crew prepared approximately 135 cubic yards of concrete daily at a batch plant at the tunnel's entrance and hauled it by 24-gauge train to work site.



VIBER MODEL PX high speed pneumatic vibrator shown mounted on form in sewer tunnel. Model PX is used widely in tunnel lining operations.

Once concrete was discharged on top of T-Lock lining forms and flow commenced around full-circle forms, two external Viber Model PX high speed pneumatic vibrators were used to consolidate it rapidly and completely. Vibrators were clamped to the form and moved forward as concrete slope advanced. A Viber internal vibrator was sometimes used in conjunction with the external vibrators.

Highly experienced in tunnel lining, Kemper Construction Company designed the vibrator mounting clamp to fit the needs of this job. Clamp hangs from angle rail which extends length of form section. As slope advances, clamp may be released to switch vibrator to new position along rail without lifting it from rail.

Viber Model PX vibrators are used widely in tunnel lining operations. They are also used effectively in manufacturing concrete pipe and other precast members wherever reusable steel forms are set up on a production basis.

For further information on Viber's complete line of internal and external vibrators, contact your authorized distributor or Viber Company, Dept. 8-B, 726 S. Flower Street, Burbank, Calif.

VIBER

CONCRETE VIBRATORS SINCE 1931

Drivers last longer...

when heavy-duty trucks

use **J-M Brake Blocks**

Experienced operators know that when their vehicles are equipped with Johns-Manville Brake Blocks they can handle crushing loads without personal danger.

That's because these rugged, durable J-M Brake Blocks are engineered for the job . . . and designed for dependable performance plus maximum service life on trucks, shovels and heavy machinery.

They are "standard parts" on many famous makes of heavy-duty units. For fast, easy replacement, they are now available in Johns-Manville Assembled Sets that put new safety into your equipment.

See your Johns-Manville Distributor for data on J-M Brake Linings and Clutch Facings for industrial equipment, or write Johns-Manville, Box 60, New York 16, N. Y.

Johns-Manville Industrial Friction Sets are available in a wide range of molded or woven, rigid or flexible asbestos materials.

JM PRODUCTS

Johns-Manville

INDUSTRIAL FRICTION MATERIALS

SALES AND SERVICE...
Continued

new Rex distributor is P-D Service, Inc., Pavilion, New York, who will cover New York west of and including Wayne, Seneca, Schyler and Steuben counties.

Detroit Diesel Div., GMC: Peninsular Diesel, Inc., a newly formed Detroit, Mich., organization, has been named distributor for Detroit industrial engines. They will operate throughout Michigan's lower peninsula.

On the Sales Front

Davey Compressor Co.: J. T. Myers, vice-president in charge of sales, recently announced the appointment of L. W. Darling as assistant vice-president. Darling, a 10-yr Davey veteran, was formerly manager of government sales. He will direct the activities of more than 150 direct factory distributors.

Gulf Oil Corp.: Robert A. Hunter, has been named general manager for retail and jobber sales of Gulf's domestic marketing department. He succeeds J. L. Lenker, who recently became vice-president of British American Oil Co., Ltd.

Athey Products Corp.: Two district representatives have been added to Athey's staff. Charles Z. Holmes is the representative for the southwest region and Mike Hunter is now representative in the northeast.

Unisteel Body Co.: Harry E. McCormick, Jr., has been appointed sales manager of the Unisteel Body Co. division of Hercules Galion Products, Inc. McCormick formerly was southeastern regional sales manager.

Carboloy Dept, General Electric Co.: Robert J. Mason, since 1950 carbide sales and service engineer in the Philadelphia area, has been named manager of the Atlantic district. He succeeds E. R. Almdale who has resigned.

Leschen Wire Rope Div., H. K. Porter Co., Inc.: Richard M. McKenna has been appointed district sales representative for a territory that includes Manhattan, Bronx and all of Long Island. He had been with Edward Ehrbahr Equipment Co., New York City, for five years. Deane Courtright has been named district sales representative for Leschen wire rope in a territory that includes the state of Washington, northern and western Idaho, and Montana.

Euclid Div., GMC: Several regional sales managers have been appointed to handle Euclid product distribution and regional policy administration. The new eastern sales manager is John A. Polhemus, who will make his office in New York City. His

John A. Denie's Sons' ready-mix concrete plant, located at Memphis, Tennessee, showing part of their fleet of Macks, which now totals 60 and is still growing.

John A. Denie's Sons Company, Memphis, Tennessee, reports:

"To assure on-time service customers request delivery by MACKS"

Four years ago, the John A. Denie's Sons Company, one of the largest and oldest ready-mix concrete plants in the country, recognized their need for the most dependable, heavy-duty truck chassis available. Their problem was one of making ready-mix deliveries on time to almost inaccessible locations over extremely rough terrain. To solve it, Denie's tried just about every make of equipment. Finally, they purchased four Mack six-wheelers.

"Shortly after our Macks went into operation, customers started to call and request that their orders be delivered by Macks. They knew they could depend on them to make delivery on schedule, regardless of the rugged ground over which they had to travel. *Our records show that no Mack has ever failed to deliver a load on time,*" writes Mr. Forrest Ladd, Denie's executive vice president.

After noting the widespread customer satisfaction with their reliable service, and a thorough check of their operating costs, Denie's president, Mr. M. A. Moss began to increase their fleet of Macks. Today they have 60 Macks, and the number is still growing.

"Another interesting fact revealed by our operating reports," states Mr. H. O. Pommer, vice president in charge of operations, "is that Denie's has never had to replace an axle shaft, driveline, ring gear, pinion, brake drum, or reline any of the brakes on any of its Macks."

Denie's executives, like so many others, know from experience how well their investment in Macks has paid off for their company.

Let your Mack Branch or Distributor give you complete details . . . find out how Macks can improve your hauling operations. Mack Trucks, Empire State Building, New York 1, N. Y.

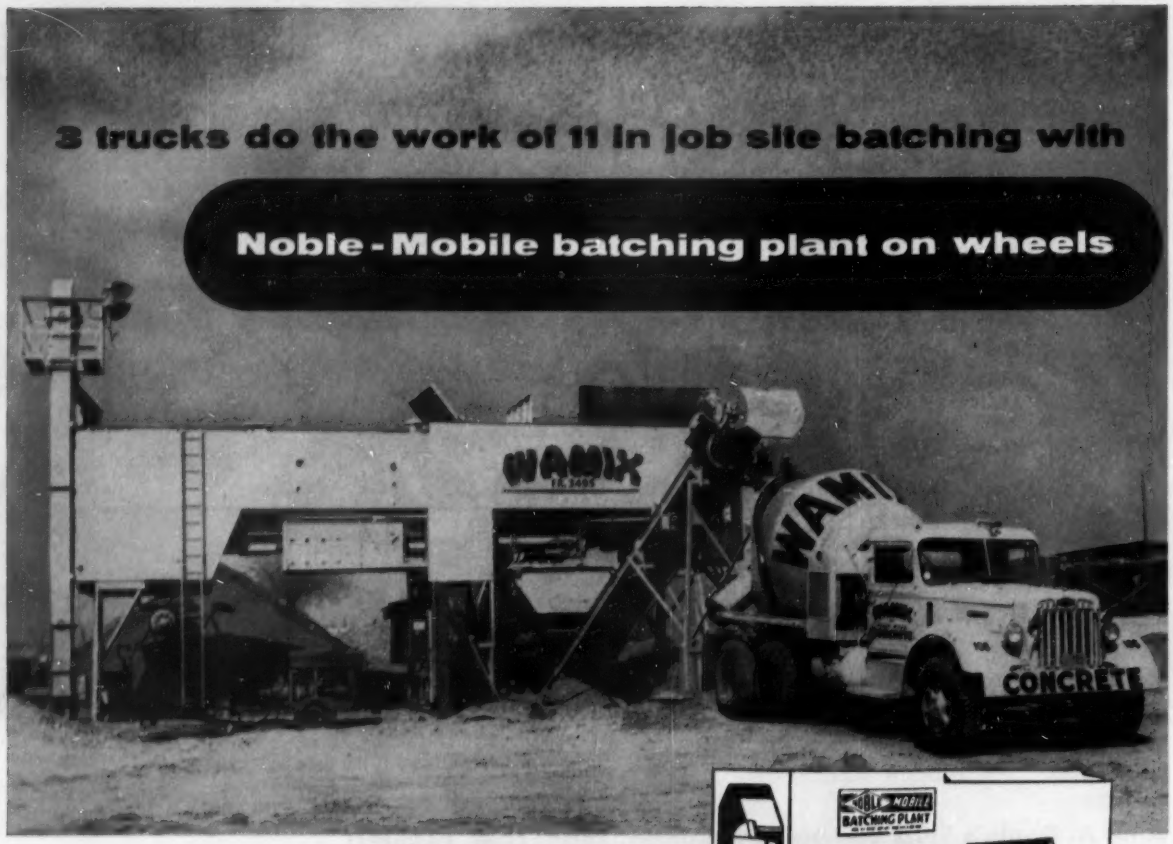
MACK
first name for
TRUCKS

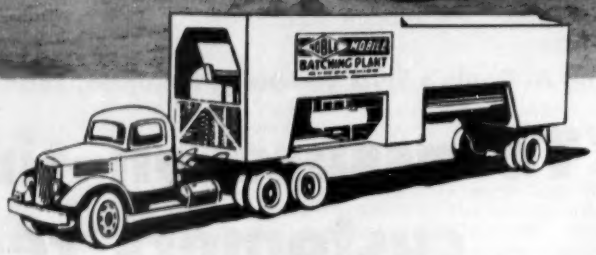
3916

(Advertisement)

2 trucks do the work of 11 in job site batching with

Noble-Mobile batching plant on wheels



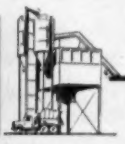


Comparatively small investment in Noble-Mobile eliminates the cost of 8 additional trucks that would be required for the 14 mile haul if batching were done at the base plant, reports Joseph Amis, Wamix, Inc., Dallas, Texas. On this Centex Construction Co. housing project, Noble-Mobile is supplying 50,000 yards of concrete for 1500 slab foundations.

Hauled along highway like semi-trailer • Set up in one day—no field wiring, foundations or crane time required on base plant • Aggregates charged with front end loader, crane or conveyor • Bulk cement utilized ...batched automatically • Excellent quality control Maximum production from mixer trucks—short hauls, more yards per day • Production capacity 60 to 100 yards per hour • Covered by patents pending.

NOBLE BATCHING PLANTS

Portable, semi-portable or stationary plants designed and built by Noble Company · 1860 · 7th St., Oakland 20, Calif. TEmplebar 2-5785



Other Noble Company offices: 20950 Center Ridge Road, Cleveland 16, Ohio. EDison 1-3426.
518 First Ave. North, Seattle, Wash. MUtual 4878 · 117½ W. Manchester, Inglewood, Calif. ORegon 8-4457.

DISTRIBUTORS

BIRMINGHAM, ALA., Equipment Service Co. • PHOENIX, ARIZ., Superior Equipment Co. • SAN FRANCISCO, CALIF., Frazar International Corp. • DENVER, COLO., Western Machinery Co. • HARTFORD, CONN., T. B. Holmes & Sons, Inc. • CEDAR RAPIDS, IOWA, James W. Bell Co. • INDIANAPOLIS, IND., Manwaring Machinery Co. • DETROIT, MICH., R. G. Moeller Co. • ST. PAUL, MINN., Borchert-Ingersoll, Inc. • CLEVELAND, OHIO, Wepco Equipment Co. • LOS ANGELES, CALIF., Smith-Booth-Usher Co. • PORTLAND, ORE., Loggers & Contractors Machinery Co. • PHILADELPHIA, PA., Furnival Machinery Co. • PITTSBURGH, PA., Equipment & Supplies, Inc. • AMARILLO, TEXAS, Plains Machinery Co. • DALLAS, TEXAS, North Texas Equipment & Supply Co. HOUSTON, TEXAS, Boehck Engineering Co. • EL PASO, TEXAS, Border Machinery Co. • WACO, TEXAS, Richards Equipment Co. • SAN ANTONIO, TEXAS, Contractors Machinery Co. • SALT LAKE CITY, UTAH, Arnold Machinery Co. • SEATTLE, WASH., Star Machinery Co. • SPOKANE, WASH., Intermountain Equipment Co. CASPER, WYOMING, Studer Tractor & Equipment Co.

SALES AND SERVICE . . .
Continued

territory includes eastern Canada, Maine, Vermont, New Hampshire, New York, Massachusetts, Connecticut, Rhode Island, New Jersey, Maryland, Delaware, District of Columbia, and eastern Pennsylvania. J. E. Ehlert, with headquarters in Cleveland, is now manager of the home office district that covers Ohio, Michigan, Indiana, and western Pennsylvania. E. C. Dellen is central regional manager with offices in Kansas City. This region includes North Dakota, South Dakota, Wyoming, Colorado, Arizona, New Mexico, Oklahoma, Kansas, Nebraska, Iowa, Missouri, Illinois, Wisconsin and Manitoba in Canada. C. B. Pace, with offices in Atlanta, is manager of the southern region including Texas, Arkansas, Louisiana, Mississippi, Alabama, Florida, Georgia, North and South Carolina, Tennessee, Kentucky, West Virginia and Virginia. R. M. Brown is manager for Minnesota and the upper part of Michigan. M. H. Johnson with offices in Oakland, is manager for Utah, Nevada, California, Montana, Idaho, Oregon, Washington, Alaska and western Canada.

In the Main Office

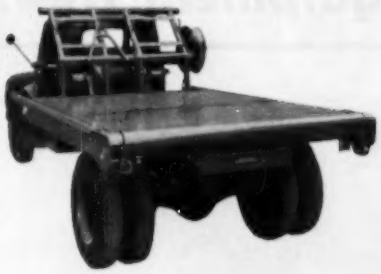
Borg-Warner Corp.: Spencer H. Mieras has been elected president and general manager of the Warner automotive parts division of Borg-Warner Corp. He succeeds Ralph Allison, who recently retired after 45 years service with Borg-Warner and its predecessors.

Allis-Chalmers Mfg. Co.: Myron W. Rhoten has been named managing director of Allis-Chalmers Great Britain Ltd. He has been European sales manager since 1953, with headquarters in Milwaukee. Rhoten succeeds E. J. Mercer who returned in January to become general manager of the tractor group's construction machinery division.

LeRoi Div., Westinghouse Air Brake Co.: Charles S. Hempelman is now market analyst for the LeRoi Div. His duties will include the evaluation of LeRoi's present markets, and research and analysis of new markets for both existing products and proposed new or modified products.

Associations

National Concrete Masonry Assn.: Earl W. Petersen, vice-president of the Ideal Stone Cement Co., Omaha, Neb., has been elected president of the association. His appointment was made at the February convention of the association in New Orleans. Three new directors of NCMA are Max H. Miller, Wichita, Kan., Franklyn L. Williamson, Winter Park, Fla., and W. B. Hovey, Santa Fe, N. M.



off-the-highway
TRUCKING
with the
Leland
"PACKAGED UNIT"

Leland Field Truck Body, Mounting a Heavy Duty Tulsa Winch
•
Specifically designed for Gin Pole Winching
•
Speeds up operations . . . less down time
•
Built-in safety features extend life of truck and winch

Call Leland also for—
Single and Tandem Self-Loading Floats
•
Pole Trailers
•
Fifth Wheel Bodies
•
SERVICE & PARTS for Truck Equipment and Tulsa Winches

Rough field conditions on heavy construction jobs demand the utmost in fabrication and performance of rolling stock . . . and Leland's famous "Packaged Unit" has earned a reputation for rugged dependability regardless of job conditions in construction, pipe line and oil field work. Leland bodies are used around the world, and a Leland representative will be glad to discuss your field trucking problems at your convenience.

Leland
EQUIPMENT COMPANY
Oklahoma City • TULSA • Longview, Texas

SKOOKUM FORGINGS

★ Timken Mill Analysis on Forging Steel.
★ Rockwell and Other Tests for Proper Temper.
★ MPI Test* before repairing
*Metal Particle Inspection

SKOOKUM will build ANYTHING in a BLOCK or FORGING!

Write for full information on Skookum Blocks, Fairleads and Forgings TODAY!

The SKOOKUM-CO., Inc.
5524 N. CRAWFORD, PORTLAND, OREGON, U.S.A. • 541 TERMINAL AVE., VANCOUVER, B. C., CANADA

INDIAN
DRINKING WATER & SUPPLY TANK NO. 75G

Replaces unsanitary bucket and dipper. Portable. Push button faucet. Takes cold, clean water to workers right on the job. 5 gal. steel tank is curved to fit the back. Sturdy construction. Highly popular. Send for circular.

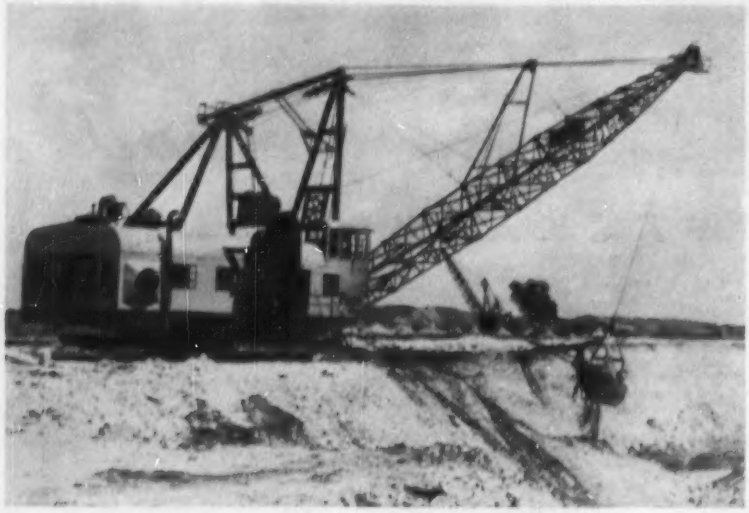
SMITH
Compressed Air
No. 22GO BANNER SPRAYER
Capacity 4 Gals.

For spraying Silicon water repellants for masonry work and many other spraying purposes. Finest compressed air sprayer built. Send for catalog.

Discounts in Quantity Lots

D. B. SMITH & COMPANY
"Choice for Quality the World Over"
450 Main St., Utica 2, New York

Construction Equipment News . . .



V-type Horizontal Diesel Powers New Draglines

The Page model 712 walking dragline, shown with a 125 ft boom and 7-yd bucket, is typical of a new line with capacities of from 5 to 15 yd. Powered by a new V-type horizontal diesel engine designed by Page especially for dragline operation, the draglines feature a single-deck superstructure that provides greater mobility and faster erection. Booms are supported by a becket staff and cable system that strengthens them at three equally spaced points along their length.—**Page Engineering Co., Clearing Post Office, Chicago 38, Ill.**

Lays Curb and Gutter

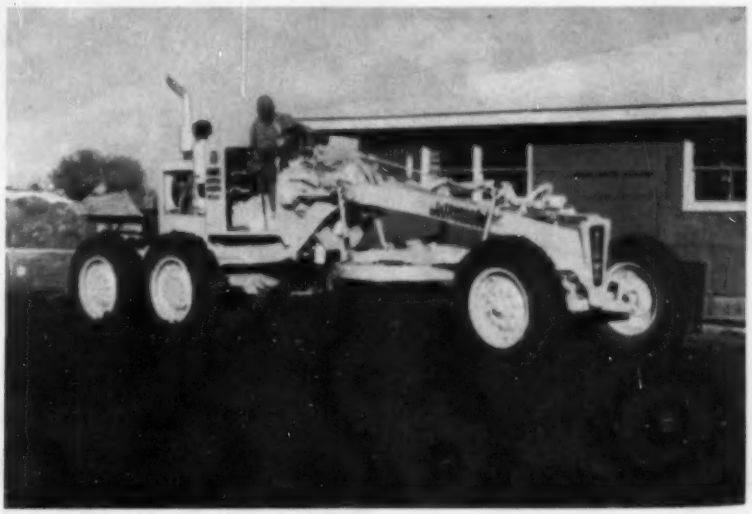
The Smith-Field automatic curb machine lays down an integrated curb and gutter without the need of forms. Running on angle iron tracks, the machine feeds either asphalt or concrete at the rate of 3 fpm. Little or no hand finishing is required after the curb is layed, according to the manufacturer. Powered by a 10-hp Wisconsin motor with a reduction gear, the machine lays a one-piece curb and gutter 24-in. wide at the top and 25½-in. wide at the base. Other mold sizes are available. Expansion joints are cut automatically.—**E. L. Hardin Assoc., Inc., Salisbury, N. C.**

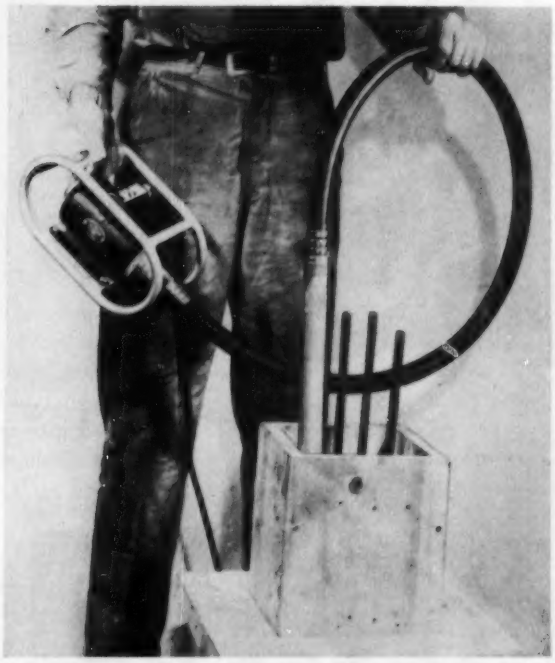
Handles Grades With Ease

To make it easier to travel and operate on steep slopes, Warner & Swasey Co. has redesigned the Gradall's crawler mounting and made available a wide choice of track widths ranging from 18 to 48-in. With the wider track widths, ground bearing pressures as low as 3½-psi are possible, according to the manufacturer. Controls have also been improved so that one lever now regulates all travel speeds. Powered by a 44-hp engine, the Gradall has two low speeds with full power both forward and reverse.—**Warner & Swasey Co., Cleveland, Ohio.**

Hydraulic Gears Triple Blade Swing

Because hydraulically powered lift and lateral shift gear assemblies triple the blade swing of conventional ram-action lift assemblies, the operator can move the blade of the Adams 200 motor grader from a ditching position to a full vertical bank cutting position without leaving the cab. The 14, 865-lb, 60-hp grader also has a circle reverse mechanism that revolves the blade through a full 360 deg. A sliding-gear transmission gives five speeds from 1.8 to 18.3 mph. Creeper gears add four low speeds. — **LeTourneau-Westinghouse Co., Peoria, Ill.**





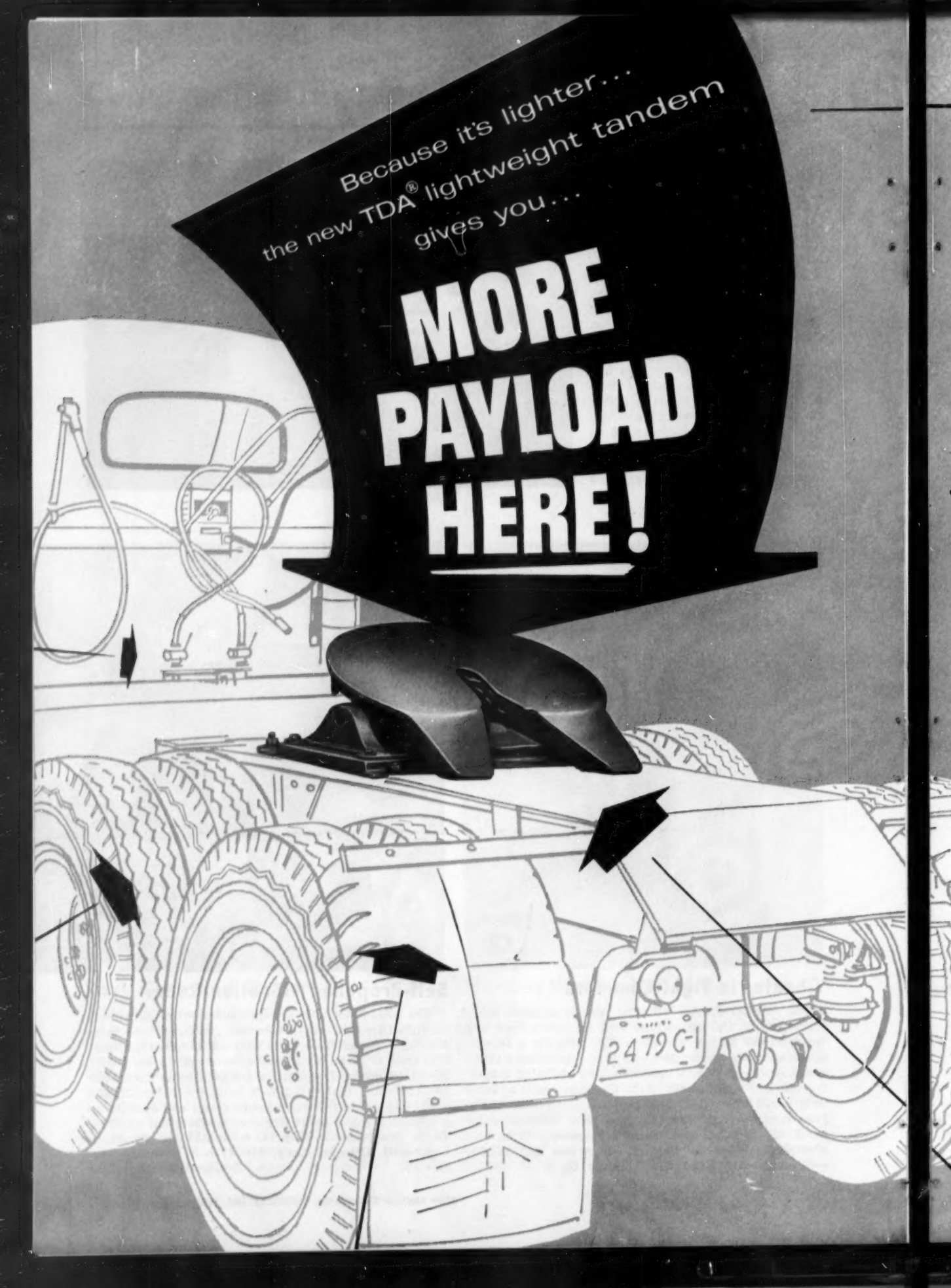
Vibrates in Tight Quarters

The WYCO Junior vibrator works around reinforcing bars and spreaders, and in forms that are too small for bigger vibrators. The unit has a 1¼-in. dia head that operates at 9,000 vpm. Including a General Electric 110-v motor protected by a tubular frame, the vibrator weighs only 20 lb. Complete with a 14-in. long head, a 5-ft long flexible shaft lined with phosphor bronze, toggle switch, and cord, the unit sells for $135. When longer reach is needed, 5-ft extension shafts with ball-bearing connectors cost $41.50. **—Wyzenbeek & Staff, Inc., Chicago, Ill.**

Self-Propelled Vibration Roller

The ABG model SW self-propelled vibration roller, manufactured in West Germany, weighs less than four tons, yet offers 4 to 18 tons variable compaction. The unit is powered by an air-cooled, 18-hp Deutz diesel. Vibration frequencies are adjustable from 2400 to 3400 rpm. Only 12 1/6-ft long, the roller climbs a 25- deg grade for truck loading and can operate as a vibration roller on 10 deg grades. Over-all width is 47 in. The roller is 39½ in. wide. 33½ in. in dia.— **Combined Agencies Corp, 910 17th St, Washington, D. C.**

(Continued on page 236)


Because it's lighter...
the new TDA® lightweight tandem
gives you...
MORE
PAYLOAD
HERE!
2479 C-1

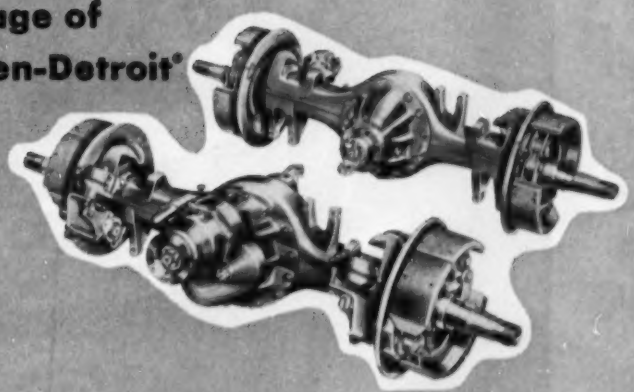
this means...

8,500 EXTRA TON-MILES PAYLOAD A YEAR

...and it's built with a high percentage of parts interchangeable with Timken-Detroit® standard single axle components

There are important *payload bonuses* for truckers in TDA's new lightweight tandem. Over 230 pounds lighter than any unit of the same capacity, this new axle assembly gives operators more than 8500 extra ton-miles of payload during an average 75,000-mile trucking year.

Important *maintenance advantages* also are gained with this new tandem. Almost all of the wearing parts—gears, pinions, differentials, bearings and brakes—are identical with components from widely used TDA standard single axles. This means easier service, smaller parts inventory, and more time on the road.



Some Outstanding Features of this New Timken® Tandem

TDA Inter-Axle Differential divides torque evenly between axles . . . yet permits wheels of one axle to revolve faster or slower than wheels of the other axle. This means both axles are doing equal amounts of work . . . driving parts and tires last longer.

Driver-Controlled Lockout—with TDA Inter-Axle Differential, the driver can obtain the advantages of straight-through drive under slick or icy conditions by locking out the differential at any driving speed.

Big, Dependable Hypoid Gears rotate in conventional direction for maximum gear and bearing life.

Optional Axle Connecting Groups. This new tandem is available with either TDA famous "Cradle Ride" axle connecting parts, or brackets to accept other approved chassis hook-ups.

This new tandem insures new payload profits, faster, easier service and operating economies for operators everywhere. For complete information contact your nearest vehicle dealer or branch.

TIMKEN Detroit AXLES

TIMKEN-DETROIT AXLE DIVISION
ROCKWELL SPRING AND AXLE COMPANY
DETROIT 32, MICHIGAN

The Accepted TDA Standard
TRADE MARK REGISTERED

WORLD'S LARGEST MANUFACTURER OF AXLES FOR TRUCKS, BUSES AND TRAILERS

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Plants at: Detroit, Michigan • Oshkosh, Wisconsin • Utica, New York • Ashtabula, Kenton and Newark, Ohio • New Castle, Pennsylvania

Black & Decker® HEAVY-DUTY SAWS ARE POWER-BUILT to last!

We don't buy motors—we build them!

The *heart* of your electric tool is the motor—completely built by Black & Decker. All the power you need and then some . . . because each motor is built for a specific tool and the job it must do. B&D motors always *stand up!*

NEW 6½" Saw races through 2x4's . . . even at a 45° angle

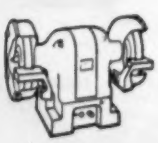
Black & Decker offers *the complete heavy-duty* saw line—with enough power and versatility for every professional need. This *new* B&D 6½" Heavy-Duty Saw (shown above) makes all cuts in 2x10 and smaller lumber, even at a 45° angle with *blade to spare!* And all B&D Saws—6", 6½", 7", 8" and 9" models—handle practically any building material: ferrous and non-ferrous metals, corrugated sheets, ceramics, tile, slate, Transite.

Latest safety features, latest *convenience* features—telescoping guard, larger lift-lever, instant-release trigger switch; calibrated quadrant, larger wing nuts, for faster, easier depth and bevel adjustments . . . clear-view operation . . . easier cutting from right or left side! Every B&D Saw is *Power-Built* for years of satisfactory, efficient service! See your B&D distributor or write: THE BLACK & DECKER MFG. CO., Dept. 2605 Towson 4, Md.

SANDERS

HAMMERS

DRILLS



BENCH GRINDERS

SERVICE . . . one of 42 Black & Decker factory service branches is located "next door" to you. Staffed by experts to give you fast, efficient service, genuine replacement parts.

LOOK IN THE YELLOW PAGES UNDER "TOOLS-ELECTRIC"

Black & Decker®

PORTABLE ELECTRIC TOOLS

UNIQUE FLOOR LOADER, brainstorm of an equipment superintendent, loads materials into a building four times faster than normal.

A New Way to Load Buildings

"NOW WHY didn't I think of that?"

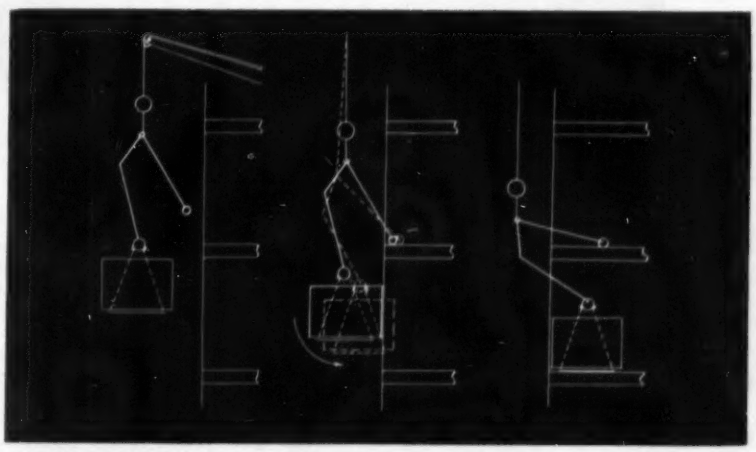
Many a construction man asks himself that question whenever a new tool that's simple in concept and cuts costs drastically comes into the industry. A unique floor loader which soon will be introduced to the construction market is such a tool.

The loader is a simple—almost elementary—device. It engages the cost-free services of gravity to place building materials into structures more safely, and at one quarter the cost of standard loading methods and the designer says it can eliminate a hoist.

The device is nothing more than two 20-ft structural steel beams bent into hairpin shape. The beams are connected parallel to each other, 4 ft apart, by welded steel brackets. A crane lifts the loader by two chains that are connected to steel straps welded to the curved portion of the device. Ends of the upper legs are fitted with steel wheels. Lower legs are fitted with carrying rods and lengths of chain (see photos) to carry pallet-loads of material.

This is how it works. A workman places the carrying rods through the opening of a material pallet. The crane then lifts pallet and load to the floor above the

(Continued on next page)



OPERATING THE LOADER is simple. Crane first lifts rig carrying pallet-load to required floor. Upper leg of loader catches on slab causing lower leg to swing down to deposit load.

WORKMAN KEEPS loader legs facing building with the help of a hook. Same man will disengage pallet-load from the loader.

PALLET-LOAD of block falls neatly into place on structural slab. Carrying chains can be adjusted for floors of different heights.

floor requiring the material. When the rig comes up against the building, the upper leg (fitted with rollers) catches onto the floor. As the crane lowers the loader, gravity takes over and causes the upper leg to roll in over the floor. The weight of the load forces the lower leg to swing in over the floor below, depositing the pallet-load of material 40 in. in from the floor edge. A workman then has only to unstrap the pallet-load, and the crane lifts the device free. Carrying chains of the loader can be adjusted for floors of different heights so that the pallet will always come to rest securely on the floor below.

The loader can be used on structures of any height reachable by crane boom. It works best on buildings under 10 stories because crane operation can be better controlled. A Chicago boom can be substituted for the crane. The loader handles everything needed within the building and places it close to where it will be used. Materials which can be loaded this way include cinder block, back-up bricks, glazed tile, door and window frames, cement, and sand. The loader also works without a pallet: slings can be substituted for rods to lift materials that cannot be palletized.

How It Started

The floor loader is the brainstorm of Paul McDonough of Boston, Mass. McDonough, a veteran equipment superintendent, got the idea for the rig while watching a crane laboriously lifting brick and other material into a building. A hoist also was being used for loading.

"It took so long!" McDonough said. "And even after material was on the floors, it had to be redistributed to where it would be used."

McDonough thought it should be possible to find a way to get material closer to spots where it would be needed, and get it there faster.

These are the normal steps to a loading operation. A truck arrives on the job. Brick is unloaded and stockpiled near the hoist or crane. It then has to be moved onto the hoist, lifted, and moved off the hoist onto the floor. From the unloading point, it once more must be moved to where it will be used.

"At least five separate operations," McDonough said, "which not only cost money but increase accident potential."

Working nights at home, McDonough came up with what seemed like a solution to the handling problem: the floor loader. McDonough tested it one Sunday on the job using a crane and a four-man crew. Results exceeded his expectations. The crew loaded as much brick in one day with the loader as it did in four days with a hoist.

So he got Whirl Tool Co. of Alston, Mass., to manufacture two loaders which he promptly sold to Farina Construction Co. of Newton, Mass., and John Bowen Co. of Boston. Farina used the loader on the 14-story, $7 million Worchester State Mental Hospital, a reinforced concrete job. Bowen used it on the multi-story, $14 million Columbia Point Housing Project. On each job, McDonough said, the loader paid for itself in a week's time.

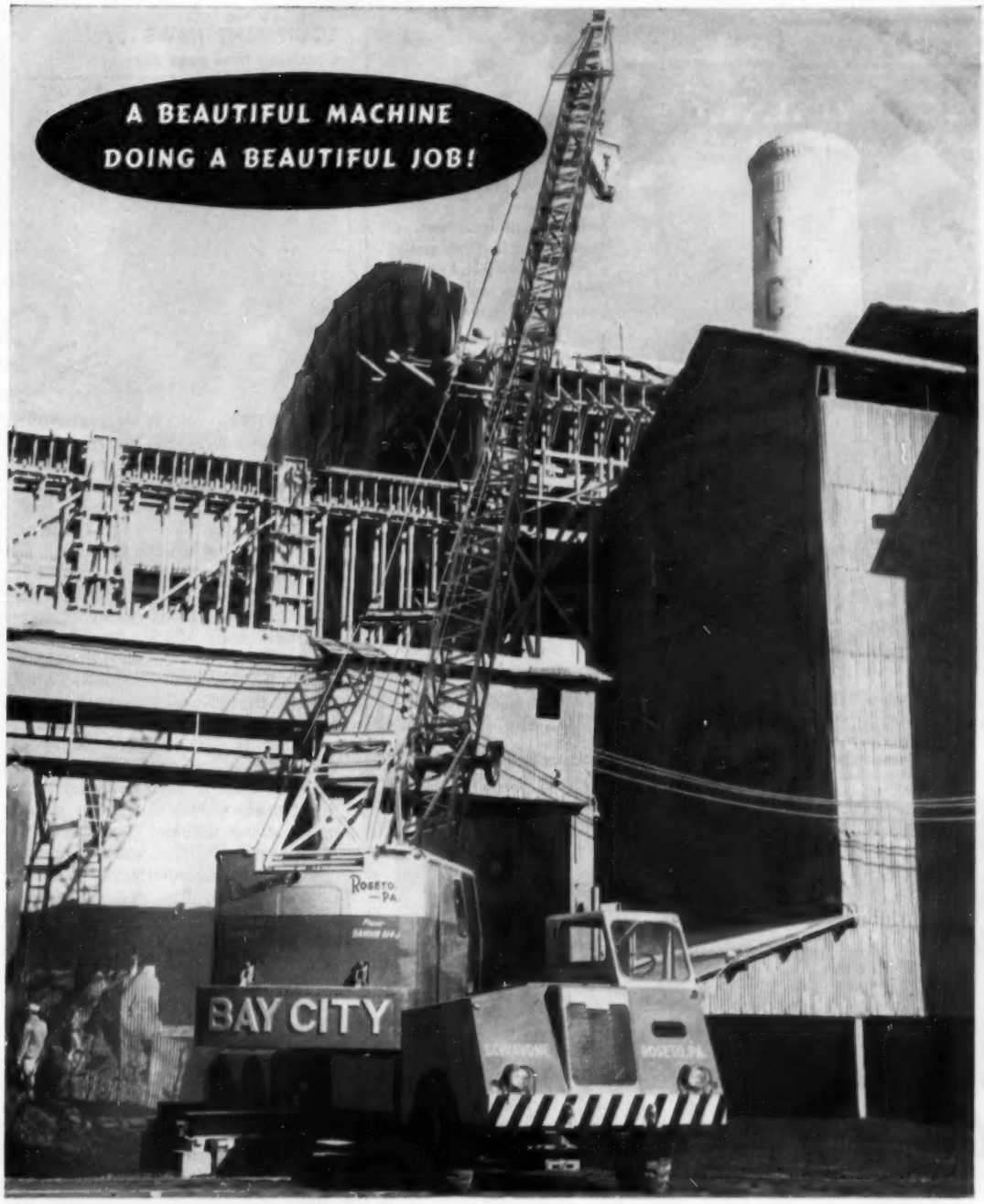
The rig is priced high ($1,975 fob Boston). But McDonough is so certain of what it will do that he has offered to install it free on any job "provided I get 50% of what it will save in loading costs."

And A Brick Lift Too

McDonough also dreamed up a companion piece to the loader: the brick lift. This is a cage-like affair which is used for lifting face brick after a building has been closed in. The lift is crane operated. It picks up unpalletized loads of brick and places them on scaffolds in neat piles ready for use. This rig sells for $975. Both lift and loader are distributed by A. F. Kuehne of Needham, Mass.

PRODUCTIVE MAINTENANCE

Good care of equipment can spell the difference between a profit and loss on many projects. The downtime induced by the failure of one big machine can be quite costly. Accumulated losses with many small tools cost money too. Read about Productive Maintenance in CONSTRUCTION METHODS and Equipment in July issue.



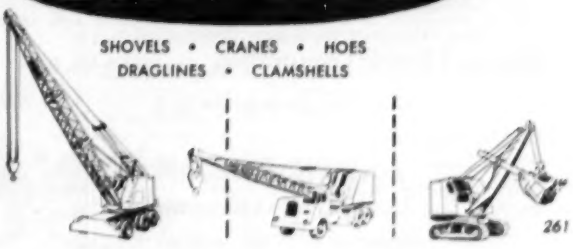
BAY CITY 25 TON CRANEMOBILE TAKES CONCRETE 105 FEET UP!

Equipped with 105 feet of boom, this BAY CITY 25 ton CraneMobile is placing concrete on a fast, smooth cycle in Nazareth, Pa. The CraneMobile will raise maximum boom from horizontal without help from another crane. An independent worm boom hoist raises and lowers boom or boom and load through reversing clutches under power, thus giving complete control of boom operations at all times. This highly mobile, rubber-tired BAY CITY is available in a range of capacities up to 25 tons, and in a selection of carriers to fit the job. High Gantry collapses for travelling to 11'-8" overall height and the pin-connected boom requires little time for boom length changes. Write today for your CraneMobile catalog or see your nearest dealer.

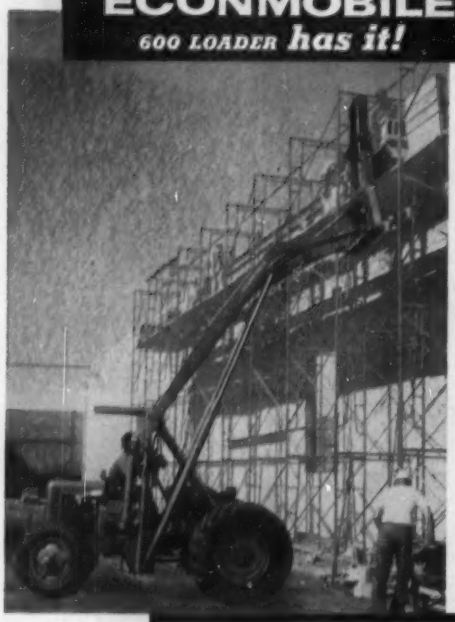
BAY CITY SHOVELS, INC. • BAY CITY, MICHIGAN

BAY CITY

SHOVELS • CRANES • HOES
DRAGLINES • CLAMSHELLS



reach?... the ECONMOBILE 600 LOADER has it!



The ECONMOBILE has a reach of up to 6 feet from wheel to heel of the pallet fork or auxiliary tower. That means you can easily move your material up and over the scaffolding as well as obstructions.

The ECONMOBILE has these other outstanding features: Hoisting height up to 22'; built-in ruggedness; power; stability; versatility; mobility; maneuverability; traction and flotation.

The savings in general labor effected through the use of the ECONMOBILE exceeds 70%.

write, wire or call

AMERICAN ROAD EQUIPMENT COMPANY
4318 North 28th Street Omaha, Nebraska
Phone PLeasant 2575

Tachographs can protect and improve your operation three ways:

1. Promote safer driving habits
2. Cut down tire wear and fuel consumption
3. Reduce over-all maintenance costs

Making the investment in a Tachograph for every vehicle you operate is sound business. Hundreds of safety-minded, cost-conscious contractors everywhere have found this to be so.

As an accurate recording speedometer, the Tachograph automatically and permanently records vital trip information on an easy-to-read wax-coated chart. This chart shows when truck started, how fast it traveled, when it stopped, idling time and distance between stops. Illuminated dials on the face of the tamper-proof aluminum case show the time of day, miles per hour or revolutions per minute, depending upon type of instrument installed, and total mileage. A red light also warns driver whenever your company's predetermined speed limit is exceeded.

Use the coupon below to send for your free copy of Wagner Bulletin SU-3—it tells the *whole* Tachograph story and there is no obligation, of course.

Wagner Electric Corporation 6462 Plymouth Ave., St. Louis 14, Mo.

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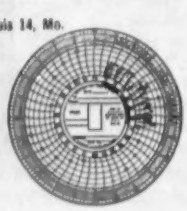
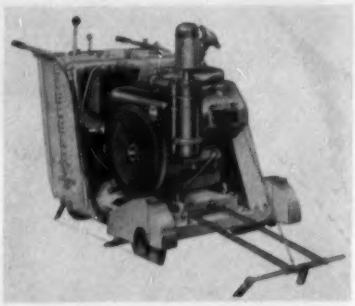
S56-6A



EQUIPMENT NEWS . . .

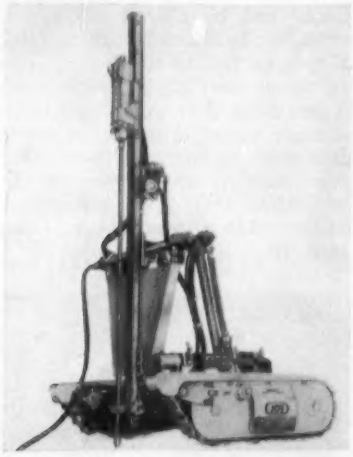
Continued from page 229



CONCRETE SAW — Eveready's new model E-36 PD concrete saw, powered by a 36-hp, 4-cylinder air cooled engine, will travel under a full load at speeds up to 25 fpm, according to the manufacturer. Largest in the Eveready line, the new saw is propelled with rear wheel drive with two abrasive-coated drive wheels in direct contact with solid rubber tires to give good traction. The saw incorporates Eveready's "Tip-N-Turn" feature that allows easy maneuverability. The saw is merely tipped and then turned in much the same manner as a wheelbarrow is turned. This is accomplished by a design that places the motor ahead of the front wheels. The E-36 PD also features "Hydra-Eze" depth control, an engine-driven hydraulic mechanism that feeds the blade smoothly into the material. The saw has a dual blade shaft that allows right or left side cutting without extra parts. All cutting controls are dashboard mounted.— **Eveready Briksaw, Dept 230, 1509 S. Michigan Blvd, Chicago 5, Ill.**

EXHAUST BRAKE—A new exhaust brake introduced as optional equipment on its trucks by Mack Trucks, Inc., is said to add greatly to diesel truck safety by increasing engine retardation by more than 50%. A simple butterfly valve in the exhaust line creates back pressure that virtually converts the engine to an air compressor. This augments full engine braking and reducing wear on the brakes. Power to operate the butterfly valve is supplied by an air cylinder connected with the regular airbrake system on the Mack trucks. Besides assisting the conventional braking system in slowing down or bringing the truck to a stop, an electro-pneumatic control system enables the exhaust brake to assist the conventional

system in slowing down the vehicle on steep down grades.—**Mack Trucks, Inc., 350 Fifth Ave., New York 1, N. Y.**



SELF - PROPELLED DRILL — Called the first completely power-operated wagon drill by the manufacturer, the Jr. Challenger is a self-propelled, track-mounted drill that mounts a 360-lb, 4½-in. drifter, drills up to 3½-in. dia holes to depths of 40 ft. Since all movements of feed and drill are performed hydraulically, no chuck wrench adjustment is necessary. Tramming power is provided by two air motors, one for each tread. Because they are directly connected, drive chains are eliminated. Each tread moves up or down independently to conform with terrain, then is locked by turning a valve so that it remains solid during drilling.—**Joy Mfg. Co., Henry W. Oliver Bldg. Pittsburgh, Pa.**

GAME WITH A MORAL—"Play It Safe" is a game that uses object familiar to all good construction men to emphasize the importance of safety. The game is played with seven dice. On six of the dice, the word "safety" is spelled out, one letter appearing on each side of

Kelley

. . . the finest name in concrete floor finishing equipment

For floating and finishing large areas . . .

THE KELLEY HYDRA-TROWEL

The only hydraulic trowel on the market . . . duplicates the quality of hand-troweling. Four wide dual-purpose blades are used for both floating and finishing. Blade pitch is adjusted by finger-tip control. Stationary guard ring. Low center of gravity assures great stability, eliminates drifting and gyrating. Contractors everywhere praise its effortless operation and the satin-smooth finish it puts on floors.

Write for Bulletin K-103

For floating and finishing small areas . . .

THE KELLEY BANTAM

Here's a terrific machine! Small . . . for confined areas. Light and compact . . . for extreme portability. Carry it in one hand! Fits in the trunk of your car! The Kelley Bantam Power Trowel is ideal for garages and basements and for factory repair jobs. Low center of gravity and unique blade-pitch arrangement put the Kelley Bantam way ahead of all other 3-blade power trowels.

Write for Bulletin K-107

For high-quality, dust-free concrete floors . . .

THE KELLEY COMPACTOR POWER FLOAT

Heavy-duty . . . portable . . . for compaction-floating of concrete or mastic floors. The famous Kelley Compactor scientifically floats dry-tamp topping, drives in tough and durable surface-hardening materials. A must for really good industrial floors!

Write for Bulletin K-101

For grinding surface imperfections . . .

THE KELLEY FLOOR GRINDER

A perfect machine for all general floor grinding. Developed because of increasing demands for a portable floor grinder. Serrated grinding ring is 24-grit silicon carbide, 14" in diameter.

Write for Bulletin K-108

A few good distributor territories still available.

Kelley **MACHINE DIVISION**

WIESNER-RAPP CO., INC.

285 HINMAN AVE., BUFFALO 23, N. Y.

Everything

FOR MORE PROFITABLE PAVING

JACKSON PAVING TUBE (INTERNAL TYPE)

Jackson Multiple Vibratory Compactor

JACKSON SIDE FORM VIBRATOR

JACKSON VIBRATORY SCREED

JACKSON POWER PLANT

MACADAM BASE COURSES, SUB-BASES, SOIL-CEMENT PAVING, FILLS

The JACKSON MULTIPLE COMPACTOR has now thoroughly demonstrated that it is by far the most advantageous equipment for achieving or exceeding specified densities in rock, slag, sand, gravel . . . all granular soils used in waterbound and penetration macadam construction, and in filling the voids in rock and slag courses with fines. The Jackson does it in about half the time required with other types of equipment. It is equally efficient for consolidating large granular soil fills such as bridge approaches and kindred projects.

JACKSON INTERNAL TYPE PAVING TUBE

Supplied with extraordinarily powerful motors, no concrete highway or airport paving job is too tough for this improved machine. Tubes vibrate deep in concrete, quickly plasticizing harsh dry mixes in slabs to 24" thick and as wide as 25'. It saves time, saves cement; provides greater density and compressive strength. Cuts spreading costs where no spreader is used. The tube is made up of one unit as shown for each 5'-0" (maximum) of slab width. Usually attached to front of finisher and controlled by finisher operator. Power is supplied by a Jackson Power Plant mounted on the parent equipment.

Use of a JACKSON Side Form Vibrator on standard finisher assures thorough consolidation and plasticity of concrete at side and center forms — with no "missed" spots. Labor savings effected quickly repay cost of equipment.

MUNICIPAL PAVING — BRIDGE DECKS, ETC.

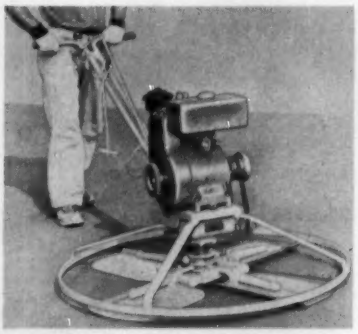
For jobs of this type a JACKSON Vibratory Screed and Portable Power Plant is the most convenient, productive and inexpensive outfit you'll find anywhere. Strikes off to any crown, undercuts at curb and sideform, works right up to and around all obstructions. Two men easily handle it on all slabs up to 30 feet wide, and it may be rolled back for second passes on 4 rollers.

PORTABLE POWER: Thoroughly reliable, time-proved plants in capacities of 1.5 to 7.5 KVA . . . equipped with permanent magnet generators requiring no maintenance or adjustment. They provide both single and 3-phase 120V., 60 Cy., AC and may be used for lights as well as operating all JACKSON equipment.

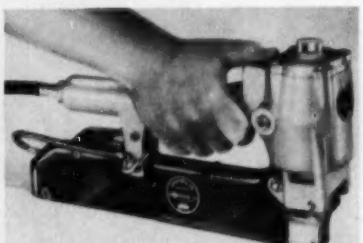
FOR SALE OR RENT AT YOUR JACKSON DISTRIBUTOR

JACKSON VIBRATORS, INC.
LUDINGTON MICHIGAN

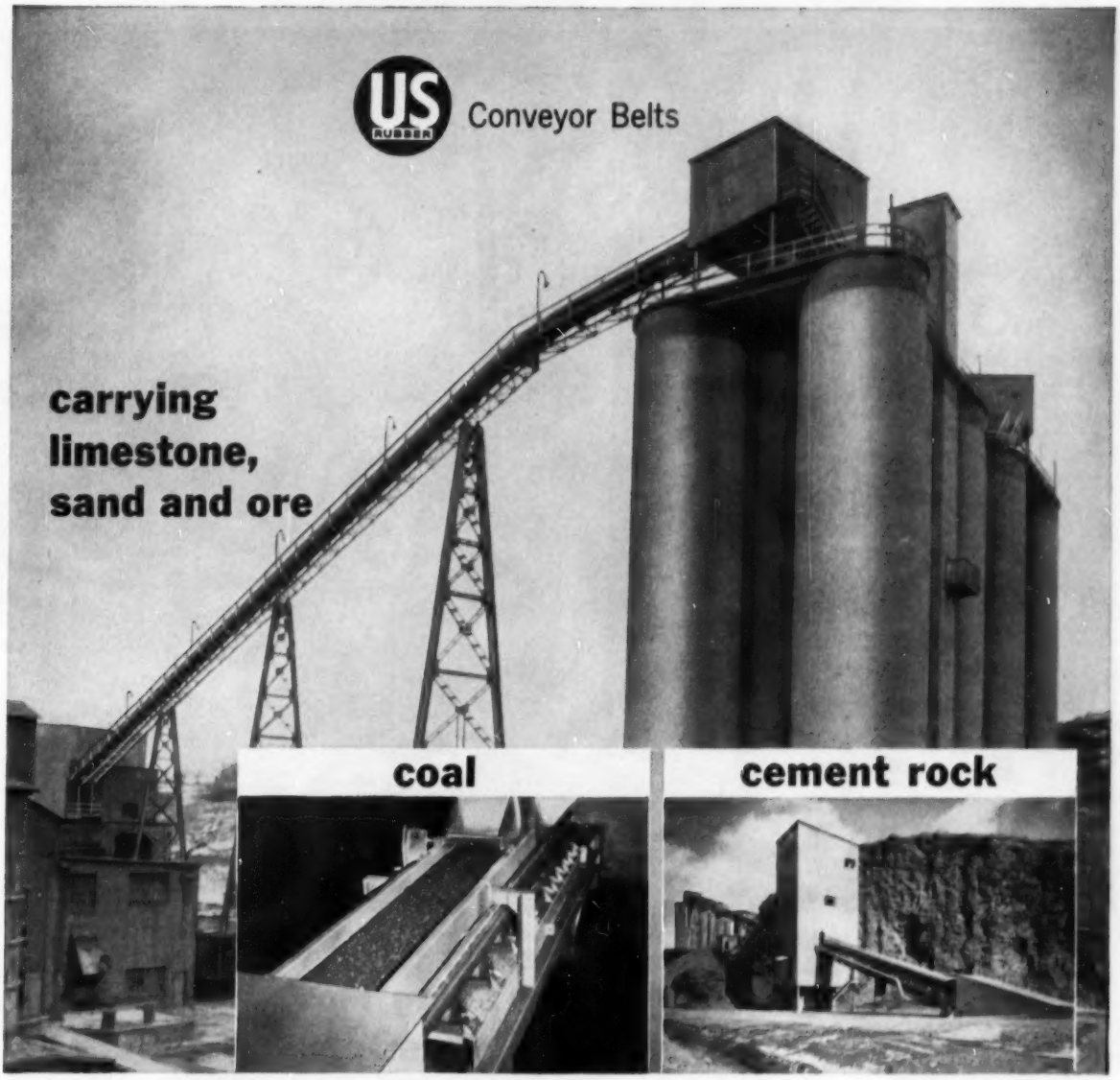
each die. A seventh die is lettered "wild." The players each roll the dice six times and the player who shakes the highest score, determined by numbers allocated to the letters, is the winner. "Play It Safe" can be played solitaire or with two to six competitors. While the rules fail to mention it, construction men might possibly add a few rules that would add to the already valuable moral — safety. But even as the rules now stand, it's a painless way to keep the idea of safety in mind. — **Robert L. Moore, 2639 Princeton Ave., Evanston, Ill.**



CONCRETE FINISHER—A new 4-blade concrete finisher features adjustable pitch blades that help compensate for the various surface conditions encountered during finishing operations. Other features included sealed and life-lubricated gear box, Timken main bearings, mercury safety switch, easily accessible handle controls, and a stationary ring guard. The finisher is powered by a 2-hp air cooled engine.—**Superior Cement Tool Co., 11616 Wright Rd., Lynwood, Calif.**



PNEUMATIC NAILER—A pneumatic attachment for the standard mallet-drive Spotnailer adds to the convenience of automatic nailing. Now a one hand operation, the Spotnailer is useful for applying hardboard or plywood paneling, or other materials that require holding in position while nailing. The



it's 100% "U. S." Belting in this cement plant's new raw-materials handling system

When this Pennsylvania cement plant expanded its raw-materials handling system, it chose U. S. Conveyor Belts exclusively. Experience had proven that "U. S." belts would give the required service and economy.

A total of ten "U. S." cotton-nylon (styles EN and XN) conveyor belts carry the wide variety of materials used in the manufacture of the cement.

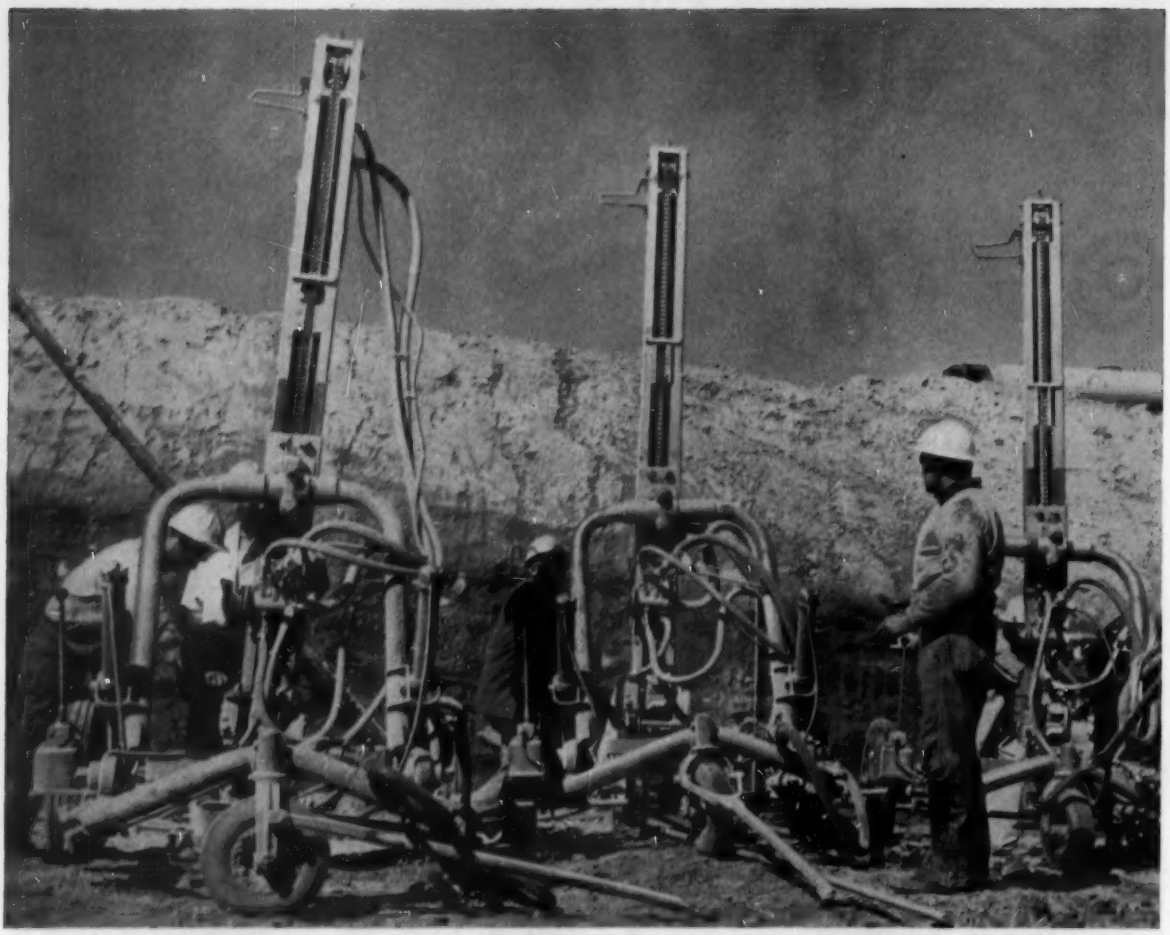
Each belt, of course, was designed for its particular job. The entire installation is a good example of Three-Way Engineering, a "U. S." technique which has always proven successful on thousands of materials handling jobs, big and small. In Three-Way Engineering, "U. S." engineers work hand in hand with the designers of the conveyor system and the engineers of the operator. This method makes sure of the right belt for the right job.

Any belting problems can be solved by factory-trained engineers of the 28 "U. S." District Sales Offices. Or write us at Rockefeller Center, New York 20, N. Y.

US RUBBER

Mechanical Goods Division

United States Rubber



Making blast holes with Bethlehem Hollow during early stages of construction for Long Sault Dam. Contractors are Walsh Construction Co. and B. Perini & Sons; Morrison-Knudsen Co.; Peter Kiewit & Sons; Utah Construction Co.

240,000 cu yd of Dolomite Being Moved for Long Sault Dam on St. Lawrence

What you see here is Bethlehem Hollow Drill Steel making blast holes in dolomite at the site selected for Long Sault Dam, near Massena, N. Y. The dam, part of the St. Lawrence River Power Project, is to be a curved concrete gravity-control structure, 2890-ft long. Including earth wing dams, its eventual length will be 7340 ft. Its 30 ogee spillway openings will be controlled by 50 ft x 28 ft vertical lift gates, flanked by concrete overflow sections and earth embankment to high ground at each end.

Bethlehem Hollow was used almost exclusively on this job, in ⅞-in. hexagons and 1¼-in. rounds, fitted with carbide-insert bits. Because of the rock condition, blast holes were limited to 5 ft. The drill steel performed economically, with minimum breakage.

Wherever there's rock to be moved, whether for a dam or highway, or in a mine, or some other application, you can count on good, steady performance from Bethlehem Hollow. That is because it is rolled from a special grade of steel which is resistant to fatigue. Bethlehem Hollow has a uniform hole, centrally located in the bar. It also has a wide quenching range, and is easy to heat-treat for the proper balance of toughness and wear-resistance, making possible long-wearing threads and strong shanks.

Bethlehem Hollow is made in carbon and ultra-alloy grades, in rounds, hexagons and quarter-octagons, generally in lengths of from 18 ft to 25 ft. It also comes in longer lengths to meet special needs. Keep Bethlehem Hollow in mind for your next rock-removal project.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

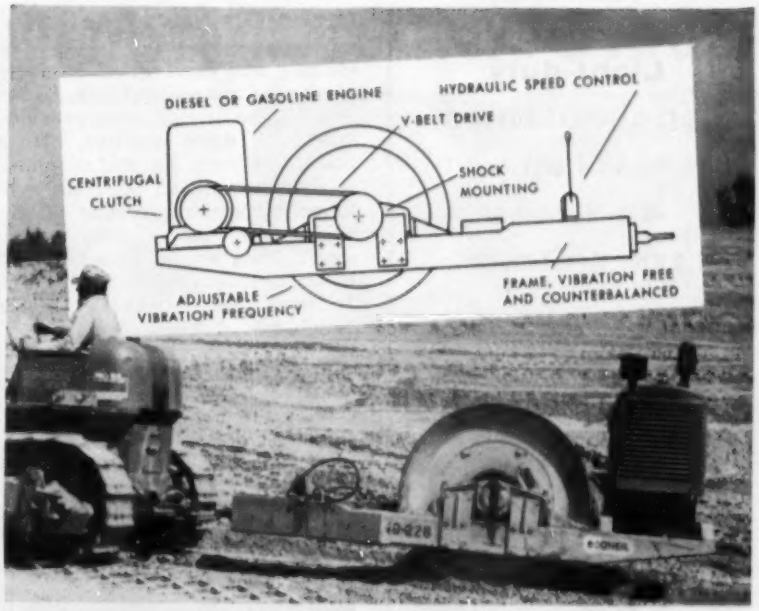
BETHLEHEM HOLLOW DRILL STEEL CARBON *AND* ULTRA-ALLOY

BETHLEHEM STEEL

tool will drive a large variety of fasteners including heavy gage staples or sash pins up to 1½ in. long. The tool's magazine holds up to 200 fasteners, and is easily reloaded. A push button triggers the tool at the touch of a thumb.—**Spotnails, Inc., Evanston 25, Ill.**

HYDRAULIC BACKHOE—Sherman has introduced a hydraulic backhoe attachment for Fordson-Major tractors. Called the Sherman Major, it is a heavy-duty unit with a digging depth of 12½ ft. With a 180-deg arc of swing, it can clear a height of 8 ft. 8 in. when loading. Twin crowd cylinders give balanced power that increases digging speed. A new bucket linkage provides maximum wrap-around and also provides a stroke up to 5,000-lb pressure through nearly 9 ft of bucket lip travel. Steel cable linkage between two opposing, double-acting hydraulic cylinders provides smooth, positive control of swing action.—**Sherman Products, Inc., Royal Oak, Michigan.**

ALL - WHEEL DRIVE—Designed to carry mixers of 5½-yd capacity, the Oshkosh model 18-34 6x6 carrier provides weight distribution of 18,000 lb on the front axle and 34,000 lb on the rear axle. Power

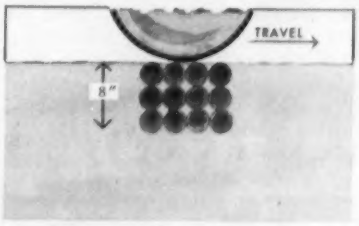


NEW CONCEPT IN COMPACTION!

VIBRO-PLUS **TERRAPAC**

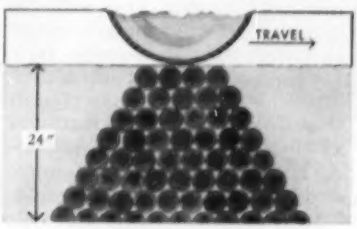
VIBRATORY ROLLER

"Terrapac" compacts faster, better and deeper in fewer passes than ordinary 30-50 ton rollers yet weighs only 3½ tons. Saves hours of valuable time because maximum density can usually be achieved in only 2 passes . . . Light enough to be easily handled on any fill or for quick transport . . . Also useful as a static roller if desired.



CONVENTIONAL STATIC COMPACTION

Rollers relying on weight alone produce friction forces between individual soil particles that prevent densification at any great depth.



TERRAPAC DYNAMIC COMPACTION

Vibratory forces, transmitted to soil in all directions, reduces friction — facilitates relocation of particles at far greater depths.

An actual field test under State Highway supervision showed that a specified 100% standard proctor density could be obtained at a 24" depth after 2 passes with a "Terrapac" . . . A 15 ton smooth roller required 20 passes to obtain specified density at only an 8" depth!

VIBRO + PLUS

PRODUCTS, INCORPORATED

STANHOPE, NEW JERSEY No. 41-6

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NEW WACO
Light-duty
SCAFFOLDING
holds up to
40 TIMES
ITS WEIGHT

Here's scaffolding that's really rugged, and that takes excessive weight "in stride." One frame safely supports up to fifty pounds per square foot. Yet the scaffolding is so light that two men (or women) can quickly and easily move large sections.

Easy to move, WACO light-duty scaffolding puts a man close to his work at all times. And, with the exclusive WACO Speedlock, it's quick to assemble and disassemble. Only four parts to a section! Just lift the Speedlock . . . pull off the pivoted cross-braces . . . and, in a matter of minutes, WACO light-duty scaffolding is ready for moving or storage. And this amazingly sturdy scaffolding can easily be made up into rolling towers.

Made of high-carbon steel tubing, WACO light-duty scaffolding is available in frames 4′ high by 4′ wide. Casters, guard rails and other accessories are available.

Investigate the new WACO light-duty scaffolding today. You'll find it's light from a *cost*-standpoint, too.

For the name of your nearest WACO distributor, consult the yellow pages of your telephone directory, or write to:

WACO MANUFACTURING COMPANY
3560 Wooddale Avenue
Minneapolis 16, Minnesota

EQUIPMENT NEWS... Continued

steering and short wheel base assures good maneuverability. Power on all three driving axles provides six-wheel drive traction. Other features include an engine cantilevered forward on the front axle to permit easier servicing of the engine and the Vickers power steer; front shock absorbers; 10 forward speeds; and a Bostrom driver's seat. — **Oshkosh Motor Truck, Inc., Oshkosh, Wis.**

OFF-THE-ROAD TIRE—A new off-the-road tire, called the Super-Fleetmaster, features a highly irregular groove pattern that is said to virtually eliminate groove cracking and offer increased resistance to side slippage. The Super Fleetmaster, with a nylon cord body, is being made in sizes from 12:00-24 with a 16-ply rating, through 16:00-25 with a 24-ply rating. Excellent steering control is claimed for the tires because of its center control rib in the three-rib design. The tires are interchangeable, since non-directional lugs permit the tire to be used on any wheel without sacrificing wearing qualities. Deep vents and flexible lugs along the shoulder area allow the tire to run cool.— **United States Rubber Co., 1230 6th Ave., New York, N. Y.**

SMALL ROLLER—A new model in its line of variable weight tandem rollers with torque converters has been announced by Huber-Warco Co. Designed for smaller

D·A

OFFERS YOU... the heavy equipment user...

Superior lubricants designed specifically for your equipment *plus* D-A Personalized services including:

1. **24 Hour Diesel Fuel Analysis** — To determine sulphur content —distillation characteristics— and ASTM grade.
2. **24 Hour Used Oil Analysis**—To establish maximum safe drain periods.
3. **Recommendation Books** — Containing factory approved recommendations for all heavy equipment.
4. **Service Bulletins** — On "Up-to-the-minute" factory recommendation changes.
5. **Prompt on-the-job Attention**—To your lubrication problems.

D-A Personalized Services are available without cost or obligation. Why not talk it over with the D-A representative in your area?

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WRITE TODAY FOR THE NAME OF THE D-A REPRESENTATIVE NEAREST YOU!

D·A

D-A LUBRICANT COMPANY, INC.
Indianapolis 23, Indiana

SPECIALISTS IN HEAVY-DUTY LUBRICATION SINCE 1919

(Advertisement)

Movalls Dump All Materials — Here's Proof

MARINE CLAY — Dutcher Construction turned to Movalls when gravity-dump wagons couldn't discharge the glue-like clay on his Seaway job; found them ideal, ordered more. Clay came out of scrapers in wheel-blocking lumps. Dozer-type ejector with 140,000-lb. push wipes every load out clean, eliminates buildup. Dutcher frequently uses one load to bulldoze previous loads. He now has 12 Movalls (rated capacity 25 heaped yds., 31 tons) powered by Caterpillar DW21 turbocharged tractors.

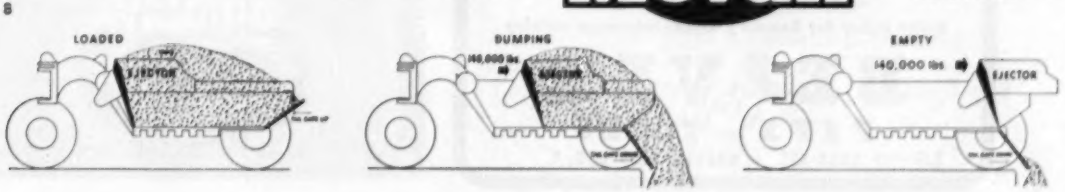
FROZEN EARTH AND ROCK — C. A. Pitts, Ltd., operates eight C & D Movalls powered by Cat DW21 tractors on Seaway job near Prescott, Ontario. Movall bodies are built for extra heavy duty, take shock of 6-yd. bucket loads of rock and huge frozen chunks without damage. Big 11′ x 19′ target area and low 8′ height make for easy spotting and fast loading by shovel, dragline or belt loader.

WET SAND, GRAVEL — RD15 Movall, for use with Cat DW15 and DW10 tractors, has rated capacity of 16 yds. or 22 tons. Here it's discharging heavy load of wet aggregate into grizzly at controlled rate. Exclusive scraper-in-reverse design enables Movall to dump either standing still or traveling; operator controls action through standard Caterpillar controls.

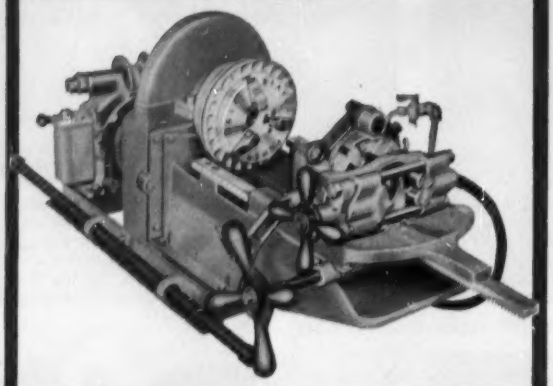
ROCK — Berlanti Construction Co., owns 5 Movalls, says, "Positive ejection enables Movall to handle rock, dirt, or sticky materials. Also we find it very adaptable when interchanging from Movall to scraper operation." Interchangeable yoke speeds changeover, permits Movalls to work behind several different prime movers.

SEE FOR YOURSELF. Ask your Caterpillar-C & D dealer NOW for a buy-and-try demonstration... or write C & D Division, Yuba Manufacturing Company, Perkins (suburb of Sacramento), Calif. Phone: GLadstone 5-8592.

HOW C&D Movall WORKS



NEW
High Speed
BEAVER



MODEL-A
PORTABLE PIPE MACHINE

The World's Fastest Portable Pipe and Bolt Machine

THREADS 2" PIPE IN 12 SECONDS!

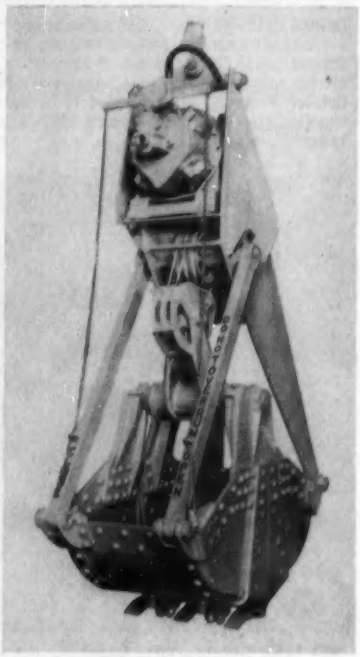
● A heavy-duty, portable machine. Low upkeep—high production! Saves time! Makes money! Power Grip Wrenchless Chuck—standard equipment. All gears run in oil. Has rack and pinion feed . . . 12 inches of working space. Cone reamer mounted on swinging arm. Oil pump accessible for easy cleaning. Rugged, long-wearing, adjustable ring-type, quick-opening die heads. Your choice of wheel-and-roller cut-off (standard) or automatic knife cut-off. Put it to work for you now!

Write today for Beaver's Quick-reference catalog

BEAVER
PIPE TOOLS
228-400 DANA AVE. • WARREN, OHIO, U. S. A.

EQUIPMENT NEWS... Continued

rolling operations, the 3-5 ton model is said to incorporate many features usually found only on medium or large tandem rollers. These include a water-cooled 41-hp engine, a spur-gear final drive, big capacity sprinkler tank, an over-sized, double-plate clutch, and an all-welded frame. Like the other rollers, the new model features a guide roll assembly with tapered roller bearings that are adjustable on the job to eliminate road scuff caused by looseness in the assembly. A curb roller attachment makes it possible to iron out paving right up to the edges of obstructions or to seal pavement against curbs or around poles.—**Huber Warco Co., Marion, Ohio.**



SHAFT MUCKER—A new pneumatic-closing clamshell bucket for shaft mucking and general excavating, is designed for use with single drum hoists. According to the Blaw-Knox Co., it is the first bucket to be produced by a major manufacturer that features integrally contained power closing. Both the ⅜ and the ⅝ yd sizes are designed to accommodate either the Ingersoll-Rand or the Gardner-Denver air hoist. Working deep in a shaft, danger of delay in signals from workmen to crane operators is dangerous. With the new bucket, workmen control its operation through open and close chains that hold the bucket jaws in position.

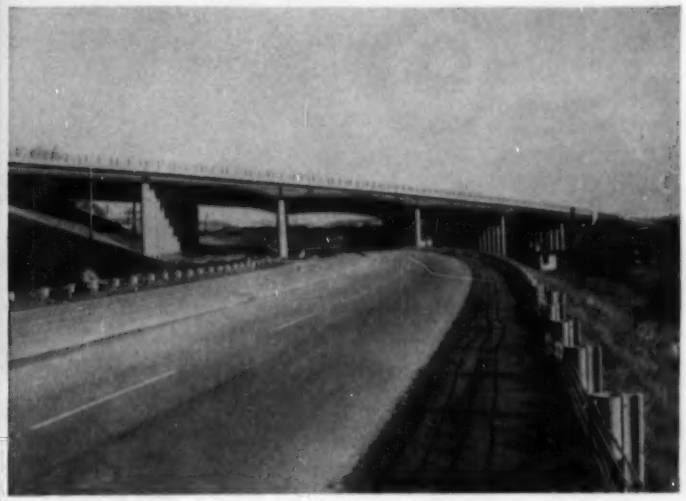
(Continued on page 247)

When bridge designs can be simplified...

Have better appearance... require less maintenance...

Yet cost less to build...

WHY don't you design all bridges and buildings for welding



100% welded deck cantilever plate girder bridge for New York Thruway. Has 6 spans totaling 775 feet. Fabricated and erected by Phoenix Bridge Company, Phoenixville, Pa. Designed in office of C. F. Blanchard, Deputy Chief Engineer, New York State Department of Public Works, Albany, N. Y.

COST SAVINGS OF 15% TO 20% REALIZED IN WELDED BRIDGE DESIGNS

FOR reasons of economy, increased public safety and pleasing appearance, welding has become the standard for deck highway bridges in the State of New York. When continuous design (made possible by welding) is used, overall depths of bridge deck are reduced to afford necessary headroom under bridge at maximum economy. Savings in foundations and fills are substantial and are in addition to savings in steel, a cost which alone averages 15% to 20% over similar riveted structures.

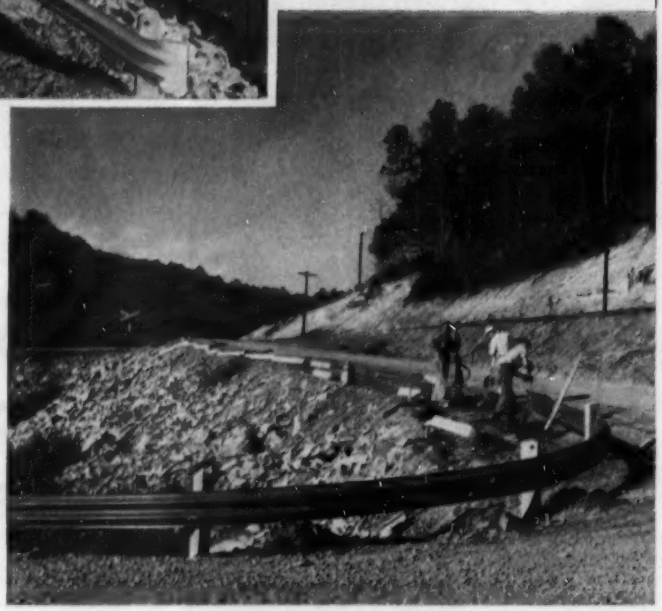
Studies in Structural Arc Weldings are available to designers and structural engineers by writing:

THE LINCOLN ELECTRIC COMPANY

Dept. 2709 • Cleveland 17, Ohio

Pioneer in Welded Structures... for Lower Cost

Armco FLEX-BEAM Guardrail is easily and quickly erected... even on sharp curves like this. Sections can be shop-curved to fit any radius from 20 to 150 feet.



Why contractors prefer ARMCO FLEX-BEAM GUARDRAIL

Perhaps most important, they find dependable Armco service makes it easy to plan and complete each job.

There is always an Armco sales office nearby to quickly provide the necessary data, and an Armco engineer to lend the knowledge gained from long experience and extensive research. Contractors like the friendly, business-like cooperation they receive from Armco.

Then too, they know they can meet installation schedules with FLEX-BEAM. Nearby Armco plants have ready inventories for delivery when and where needed.

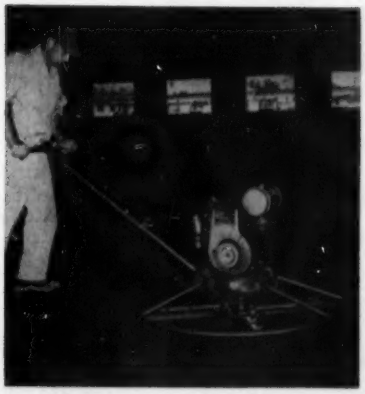
Contractors use FLEX-BEAM along the nation's most important highways, expressways and toll roads. In addition, they find it economical to install for secondary roads, dead-end street protection and parking lots.

It might pay you to investigate Armco FLEX-BEAM Guardrail for your next job. Write us or contact the Armco office nearest you for data. Armco Drainage & Metal Products, Inc., 4936 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. In Canada: write Guelph, Ontario. Export: The Armco International Corporation.

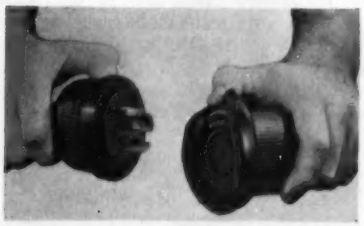
ARMCO FLEX-BEAM GUARDRAIL

ARMCO®

The upper structure of the bucket is designed to permit mounting the air hoist directly on the vertical center line so that balance is not disturbed. The bucket operates on 85 to 100 lb air pressure.—**Blaw-Knox Co., Farmers Bank Building, Pittsburgh, Pa.**



BIG TROWEL—The G 46 Roto-Trowel is practical for large floor areas since it trowels 11 sq ft of surface per revolution. Powered by a 6.8-hp engine, the trowelling speed can be varied from 25 to 100 rpm. Like other Stow trowels, the G46 features a manually actuated clutch that stops the machine from rotating the second the operator lets go of the handle. Pitch of the float and finish blades can be varied to any degree while the machine is running by adjusting a pitch control knob on the handle. The G46's four blades are protected by a stationary guard ring that makes it easy to work right up to walls.—**Stow Mfg. Co., 443 State St., Binghamton, N. Y.**



SAFE CONNECTOR—A flexible rubber lip over the female component of an UL-approved electrical connector flips over the male component to insure a positive sealing and locking action. At both ends of the connector, the cable entrances are also fitted snugly around the cable to keep out moisture, dirt, dust, and other conditions that tend to interrupt the flow

EXTRA STRENGTH and DURABILITY ...for Your Rock Drills and Other Heavy Duty Air Tools

"SUBWAY"®

"Standard of Quality"

"Subway" is built with that *extra* measure of strength and durability that assures uninterrupted delivery of maximum air power to the drills, even when the "going" is roughest. Light weight, flexible, easy to handle. Specifications include oilproof tube; highest quality wrapped duck carcass; wear- and weather-resistant red rubber cover, with new criss-cross yellow stripe for positive identification. Sizes ½" to 1¼", I.D., in maximum lengths of 50 feet.

EXTRA SAFETY ...for Your Caissons and Manifolds

"Standard of Quality"

"ALLGOOD CORD"®

"Allgood Cord" . . . long famous for its outstanding strength and safety for three most important air hose applications—supplying air to caissons where human lives are at stake; feeding air to Jumbos where a shutdown would effect not one but a battery of drills; and as a main air line to shovels in tunnel headings. Specifications include black synthetic tube; special kink-resistant wrapped duck carcass; wear-resistant white rubber cover.

"Allgood Cord" is made in sizes 1½" to 4", inclusive, in maximum lengths of 50 feet.

"If it's GOODALL, it MUST be Good!"

Contact Our Nearest Branch for Details and Prices

Standard of Quality—Since 1870

HOSE · BELTING · FOOTWEAR · CLOTHING AND OTHER INDUSTRIAL RUBBER PRODUCTS

GOODALL *Rubber Company*

GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N. J.

Branches and Distributors Throughout the United States and in Canada

COST LESS!

White vibrators cost less to buy, cost less to maintain HERE'S WHY:

. . . completely interchangeable drives and heads, no special couplings required, less spares needed for maintenance.

. . . heavier eccentric rotors in vibrator heads for better performance in concrete.

. . . power units, either gasoline engine or electric motor, interchangeable.

. . . vibrator heads, from 1¾" to 3", and grinding heads interchangeable.

. . . replacement drive shafts cost less.

White MANUFACTURING COMPANY

ELKHART 6, INDIANA

MODEL ME-13, with 2½ HP electric motor 110 V. AC or DC.

MODEL M-9 with 2 HP Lauson engine, automatic clutch.

Less down time... longer life when protective maintenance is done ON TIME!

HOBBS Engine Hour METERS

Modern engineers consider maintenance of powered equipment in terms of HOURS instead of miles. ON-TIME lubrication, filter replacement, oil change, overhaul, etc., means better performance and longer equipment life.

The Hobbs Meter, a true electric timing instrument, records actual running time in HOURS and MINUTES — not a revolution counter! Two models — direct-reading (upper illustration) and pointer type. Approved and recommended by leading manufacturers of construction equipment. Ruggedly built . . easy to install in the field. See your factory branch, representative or distributor . . . or WRITE:

John W. Hobbs Corporation
2070 YALE BLVD. SPRINGFIELD, ILLINOIS
A Division of Stewart-Warner Corporation

of current. The connector components are molded of phenolic and completely encased in a rubber or Neoprene housing. Called Flip Seals, the connectors are available in ten models with cord hole sizes ranging from .635 to .875-in. — **Rodale Mfg. Co., Inc., Emmaus, Pa.**

SWEDISH PUMP—Now available in the United States, the Flyght submersible pump can operate partially or wholly submerged, and drain to the last inch of water. When submerged, it is self priming and frost proof, and will pump water containing as high as 40% solids. The unit consists of a centrifugal pump with rubber lined diffusers and a suction strainer. The 3-phase motor is housed in a water tight container and has a vertical spindle carried on ball bearings. Four models are available in weights from 70 to 1,250 lb. The smallest discharges 10 gpm at 60 ft while the largest delivers 1,500 gpm at 65 ft.—**Stanco Mfg. & Sales Co., 1931 Pontius St., Los Angeles, Calif.**

HAULING TRAILERS—The Wisconsin Trailer Co. is making a new line of tilting-type hauling trailers with capacities ranging from 2 to 12 tons. The new line includes tandems, low platform units, and over-the-wheel models. The 10-ton

THE NEW PRIME-MOVER M30 WITH TORQUE CONVERTER DRIVE

Bulk-handling body shown. Capacity 18 cu. ft.

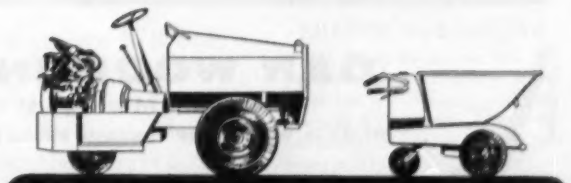
Puts greater POWER • SPEED • CAPACITY to work for you!

PROVED BY PERFORMANCE ON CONSTRUCTION

The M-30 delivers high production on your toughest handling jobs. Carries a ton-and-a-half load. Maneuvers in close quarters. Climbs steep grades. Travels fast.

Propelled by the exclusive Prime-Mover torque converter drive—no shifting—no clutching. You set the directional lever in forward or reverse—and step on the gas.

Let this husky truck with its dependable Wisconsin engine and smooth torque converter do more work for you. See nearest Prime-Mover distributor about your handling problems. The Prime-Mover Co., Muscatine, Iowa.



PRIME-MOVER

More power to you—from PRIME-MOVER

Built to take the shock of rock!

Strong-Arm Hoists and Bodies

LOAD OUT BIGGER LEGAL PAYLOADS with Gar Wood-St. Paul equipment. Rugged body design to take the shocks of shovel loading in rock . . . stress tested to put the strength where it's needed, eliminating excess weight. Body sides, corner posts and full-width rear apron are integrally tied into steel sub-structure.

DUMP FASTER WITH GREATER SAFETY regardless of load distribution. Massive torque tube converts thrust of twin-cylinder Strong-Arm hoist to equal lifting power on both sides of dump body. No one-sided dumping strain . . . greater stability on rough grades. Triple-laminated pump runs smoother, delivers dependable, trouble-free power.

CUT MAINTENANCE TIME AND COSTS by standardizing on Gar Wood-St. Paul equipment. Strong-Arm hoists are the world's easiest to maintain. You can make necessary repairs with ordinary truck tools! Exclusive tie-rod cylinder design speeds up inspection, maintenance or repair of cylinder, reduces replacement costs. Hydraulic pump is precision-machined for easier field servicing.

CALL YOUR GAR WOOD-ST. PAUL DISTRIBUTOR for specifications of the most complete, most advanced line of truck equipment on the market. Or, write to Customer Service Dept., Gar Wood Industries, Inc., Wayne, Michigan.

GAR WOOD INDUSTRIES, INC.

Wayne, Michigan • Richmond, California

Plants in Wayne and Ypsilanti, Mich.; Findlay, Ohio; Mattoon, Ill.; Richmond, Calif.

Gar Wood Truck Cranes

Gar Wood Winches

Gar Wood-Buckeye Ditchers

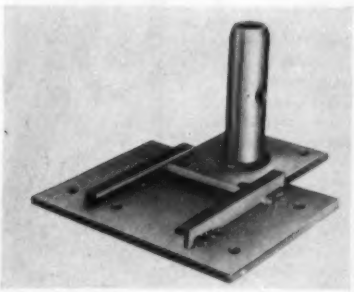
Gar Wood-Buckeye Finegraders

Gar Wood Tractor Equipment

Gar Wood Excavators

model 1000, illustrated above, features straight through axles, a 14½-in. deep frame, adjustable pintle hook, and all-wood deck without wheel openings. The 8-ft wide deck and low climb angle makes it easy for one man to load or unload in less than a min.—**Wisconsin Trailer Co., 1949 N. 121 St., Milwaukee, Wis.**

ELECTRIC MIXER—In the same way that a portable kitchen mixer can be used for more than one bowl, the new Handy Mixer can be moved from room to room or floor to floor by one man to service several tubs. Designed to bring mixed concrete, plaster, terrazzo, etc., closer to the place where it is needed, the unit consists of a mixing head powered by a 1-hp electric mixer and a tub with a capacity of 5 bags of cement. It works off 115 v.—**Master Vibrator Co., Dayton 1, Ohio.**



SHORING PLATE — The S681 Shoring Plate is designed to slide over the standard Universal S25 and S20 base plates to provide an 6x8-in. bearing surface. The plate makes use of the standard base plates to provide additional area on which to lap the ledgers on

LOOK TO WILLSON
for another new development in head protection!

NOW—SUPER-TOUGH
PHENOLIC
SAFETY HATS AND CAPS

FROM THE WILLSON RESEARCH CENTER now comes the "Phenolic" line of scientifically designed safety headgear that meets all specifications with ease!

In this Super-Tough line are safety developments so outstanding that you'll find it offers unequalled value. For instance, the famed "geodetic suspension" and the unique pneumatic headband are obtainable in both adjustable *lace-in* and *snap-in* types of hats and caps.

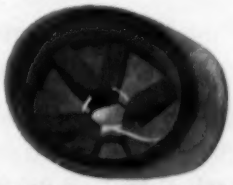
Ask your Willson distributor to demonstrate the heavy duty Phenolic line that combines comfort and maximum head protection. Or write for latest "Super-Tough" bulletin describing them in detail.

Strongest Made!

See how it's built up from 24 individual die cut pieces into a sturdy Phenolic pattern that withstands repeated 80-foot-pound drop ball tests without even fracturing!

LACE-IN SUSPENSION

Both hats and caps are available with convenient lace-in suspension feature. Easily adjusted for snug comfort to any head size.



SNAP-IN SUSPENSION

Handy Center-Tie snap-in type suspension is also obtainable in Super-Tough hats and caps. *Willson's exclusive patented "Geodetic Suspension" and Pneumatic Headband can be had in any style!*

Over 300 safety products carry this world-famous trademark

WILLSON
PRODUCTS DIVISION
RAY-O-VAC COMPANY
141 Thorn Street, Reading, Pennsylvania

LAYKOLD Weathercoat

–a "permanent poncho" for exposed insulation

If you have "hot" or "cold" tanks, towers, vessels or piping exposed to the weather, you know the problem. Insulation must be kept *dry* to be effective. Weathercoat is the answer.

High-efficiency insulation insurance

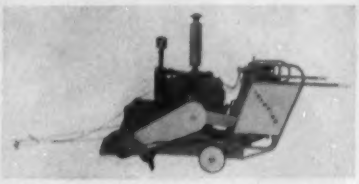
Laykold Weathercoat is the best "raincoat" your units could have because it seals out not only water but also water vapor. In addition, Weathercoat stays "alive" through season after season.

Write for full details.

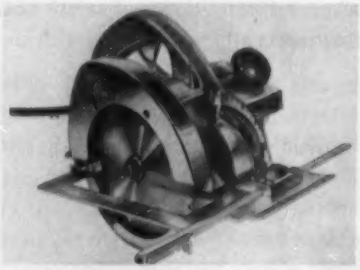
AMERICAN Bitumuls & Asphalt COMPANY

200 BUSH STREET
SAN FRANCISCO 20, CALIFORNIA

shoring jobs. The plate, like all Universal Ezebilt scaffold components, is coated with a dichromate galvanizing finsh that eliminates rust and increases the life of scaffolding. A bolt-on plate of the same dimensions is also available.—**Universal Mfg. Co., Zelienople, Pa.**



CONCRETE SAWS—New 36 and 25-hp self-propelled concrete saws have been introduced by Champion Mfg. Co. Featuring direct chain drive that is said to eliminate slippage and maintain constant torque, the new saws are powered by Wisconsin engines equipped with automotive type mufflers for quiet operation. A new type clutch permits the direct chain driven rear wheels to operate independently when disengaged. A choice of hydraulic or screw feed raises or lowers the blade. Other features include dual 14 or 18-in. blade guards, removable unit mandrel, hinged blade guard visors for curb cutting, and a variable speed self-propelling unit. Extended handle bars aid maneuverability and spot-lights permit night operation.—**Champion Mfg. Co., 2028 Washington Ave., St. Louis 3, Mo.**



1¾-HP SAW—A low-priced, portable 7¼-in. electric saw, powered by a 1¾-hp motor, features an automatic telescoping guard riding on anti-friction bearings, helical-cut alloy steel gears and sealed bearings, and an aluminum alloy housing that keeps the weight at only 14½ lb. The model 475 cuts to a maximum depth of 2-7/16 in. and a minimum of ⅛ in. List price is $64.95.—**Thor Power Tool Co., Aurora, Ill.**

(Continued on page 255)

WHY BUY LESS

...the best costs so little

CM HOISTS AND PULLERS are ruggedly constructed to give you years of trouble-free service. Yet they are unusually light... easy to handle because they are constructed of the strongest alloys of steel and aluminum. Equipped with famous CM-Alloy flexible, welded alloy steel load chain.

CM CYCLONE

- Capacities from ½ to 10 ton.
- 1-ton model weighs only 36 pounds.
- 96% efficient—easy to operate.
- Lifetime lubricated.

CM PULLER

- Capacities ¾, 1½, 3 and 6 ton.
- ¾-ton model weighs only 13 lbs.
- Lifts or pulls at any angle.
- Lifetime lubricated.

Write for catalog and name of your nearest CM dealer.

CM

CHISHOLM-MOORE HOIST DIVISION
COLUMBUS McKINNON CHAIN CORPORATION
TONAWANDA, NEW YORK
REGIONAL OFFICES: NEW YORK, CHICAGO, CLEVELAND
In Canada: McKinnon Columbus Chain Limited, St. Catharines, Ont.

Hours saved in the trench
dollars saved on the contract...

...because Transite Ring-Tite Pressure Pipe handles easily, positions automatically

• Transite® Pressure Pipe with Ring-Tite® Coupling is so quickly and easily installed —you save hours of costly trench time . . . shave dollars off job costs!

Transite goes in faster, because the Ring-Tite Coupling speeds and simplifies joint assembly. Workmen simply smooth rubber sealing rings into grooves, lubricate the pipe end, and pull pipe and coupling together. Shoulders on the pipe itself position the ends in the joint automatically. The result is a joint with positive seal, yet remarkably flexible! And these rubber rings can't blow out.

Corrosion-resistant

You can assure city officials and engineers of peak performance, year after year. Transite Pipe, an asbestos-cement product, is strong, durable, highly resistant to corrosion.

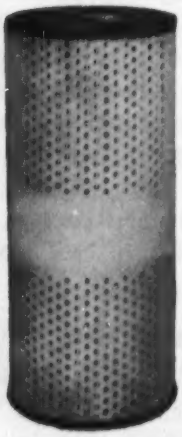
For further information about Transite Pressure Pipe and Ring-Tite Coupling, write for Booklet TR-160A. Address Johns-Manville, Box 60, New York 16, N. Y. In Canada, Port Credit, Ontario.

JM PRODUCTS

Johns-Manville TRANSITE PRESSURE PIPE
WITH THE **RING-TITE** COUPLING

103 drawbar horsepower is feature of new International TD-18A Diesel crawler.

What if dirty oil gets into the engine of a heavy-duty diesel like this?



A bearing can be worn seriously in a matter of hours if dirt-laden oil by-passes the filter and gets into a Diesel engine. This danger from by-passed, unfiltered oil is behind your International Harvester dealer-distributor's insistence that you use manufacturer-approved filter refills. He knows that they never get overloaded . . . never by-pass dangerous, dirty oil . . . never let harmful abrasives reach your engine. The reason is simple: they're built by Purolator to meet International Harvester's exacting requirements for every particular engine.

For the same reason, it pays to insist on manufacturer-approved filter refills for your Diesel. Its engine life depends on it.

PUROLATOR

"FIRST IN THE FIELD OF FILTERING"

PUROLATOR PRODUCTS, INC., Rahway, New Jersey, and Toronto, Ontario, Canada

OPERATES OFF HOUSE CURRENT—A new motor-in-head concrete vibrator operates off ordinary 115-v house current when it is available, thus eliminating the need for generating equipment. Called the Model EV25, the unit gives vibration frequencies of up to 10,000 per min. The vibrator has a sealed-in safety switch and a thermal overload device that protects the motor-in-head from overheating. Prices start at $290.—**Mall Tool Co., 7725 S. Chicago Ave., Chicago 19, Ill.**

REDESIGNED ROLLER—The redesigned Ken-Roll 1-to-3 ton roller still features a tolerance of ½-in. clearance on the right-hand side to permit rolling close to obstructions. The compression roll delivers up to 85 lb per lineal in. with water ballast and up to 138 lb per in. with water and steel ballast. Two-sec-

Compare

these extra LaCrosse values for yourself!

Quality Points	LaCrosse 10-ton tilt	Competitive 10-ton tilt
Drawbar channel	10"	7"
Main beams	8" channel	3/16" formed plate
Wing members	4" channel	1/8" formed plate
Side members	8" channel	2½" x 2" x 3/16" angle
Front stringer	8" channel	6" channel
Rear stringer	6" channel	7" box sec. 3/16" plate
Deck width	96"	92½"
Deck length	17'	14' 5¾"
Tire size	10.00 x 15" 14-ply	8.25 x 15" 14-ply
Wide base rims	Yes	No
Brakes	12¼" x 6" (Air or Vac.)	13" x 3" (Electric)
Hydraulic "cushion tilt"	Yes	No
Towing lunette	Adjustable	Stationary
Lights	Standard	None
Weight	4300 lbs.	2800 lbs.

If you could see a LaCrosse Model TSA2-10 trailer alongside several 10-ton capacity single-axle tilt-trailers, there would be *little question* as to which unit you would choose. But since you seldom have a chance to judge competitive trailers *side-by-side*, we felt this typical COMPARISON CHART would be helpful in appraising the *extra* performance features you get with LaCrosse Tilt Trailers.

As you can see in the above chart, the LaCrosse TSA2-10 is built *far more rugged* than its "10-ton-rated" competitor. The TSA2-10 also has a wider, longer deck . . . *bigger tires* . . . bigger, more powerful brakes . . . plus a hydraulic tilt mechanism that *"cushions" shock loads.* Adjustable towing lunette and ICC-approved lights are standard equipment.

Consider, too, these additional "hidden benefits" of LaCrosse *quality-controlled production:* Special frame positioners for stronger welds . . . shot blasting and undercoating for longer trailer life . . . custom-built axles, plus replaceable brake spiders for greater axle economy . . . fast parts service anywhere, anytime.

The superior performance of LaCrosse tilt decks and low-bed trailers, up to 75-ton capacity, has been pre-proved by *millions of miles* of owner use. Why be satisfied with anything else for your hauling requirements? Write for details. LaCrosse Trailer Corp., LaCrosse, Wis. LC-36

"Better Living Through Better Roads"

91 YRS. metal fabricating experience

LaCROSSE

VALUE LEADER IN LOW-BED TRAILERS

(Advertisement)

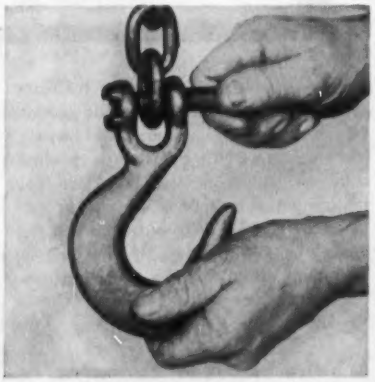
SAFETY INSURED—When a 41,300-lb. section of stone crushing equipment was placed by an American 700 Series Crawler Crane, Crosby Clips were used on all wire ropes to assure maximum safety for men and equipment. Genuine drop-forged, hot-dip-galvanized Crosby Clips, with the famous Red-U-Bolt, are specified for safety on more jobs than any other drop-forged wire rope fasteners.

STRONG SAFE, BLOCK

When cofferdam sheetings were about to be drawn from the sucking, grasping soil of the Platte River bottom, a Load-Rated Crosby Crane Block was specified. Made of highest-quality steel, and engineered for safety as well as efficiency, Crosby Blocks are backed by the famous Crosby name—recognized leader in safety. When using Crosby Blocks, workmen can't go wrong, for the safe lifting capacity is embossed right on the side plates.

EASY TAKE-UP

Important design advances by the makers of famous Laughlin Turnbuckles offer added safety and efficiency to users in the construction field. Laughlin Turnbuckle bodies have extra-heavy hex ends which allow fast, easy take-up with a wrench. An exclusive eye design takes the ear of a shackle one size smaller and is stronger than conventional eyes because it conforms more closely to the lines of pull. This design also makes it easier to attach thimbles and other fittings. Exceptionally strong, Laughlin hooks have added heft at points of greatest stress—the ¼-inch hook is actually stronger than most ⅜-inch hooks. Available in a complete range of sizes. A reference chart in Laughlin's free catalog lets you select the proper size turnbuckle for each job.



ATTACH IN SECONDS

A more efficient clevis grab and slip hook made by Laughlin has a "Crimp Style", cotter that can be removed and attached in seconds. Available in a complete range of sizes at distributors everywhere, Laughlin Clevis Grab and Slip Hooks are made of drop-forged steel special forging quality and are heat-treated for maximum strength. For free catalog on the complete Laughlin and Crosby lines, write the Thomas Laughlin Division, Portland, Maine, or the American Hoist & Derrick Co., St. Paul 1, Minnesota.

EQUIPMENT NEWS . . . Continued

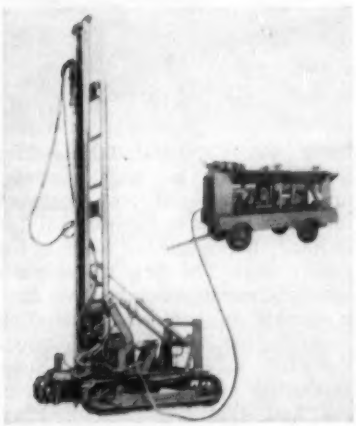
tion steering roll and truck type steering mechanism aids maneuverability. The sprinkler tank has a 93 gal capacity.—**Pfahler Mfg. Co., Galion, Ohio.**

FORK - LIFT TRUCKS — Clark Equipment Co. has announced the Clarklift line of fork-lift trucks, said to mark the first major departure in fork truck design in many years. Among features of the premium line are self-adjusting brakes, balanced swing-up hoods for ease of maintenance, combination lift-tilt controls on the steering column, optional radiator screens for dusty operations, and all-purpose deep-tapered forks. Twelve-volt electrical systems, fully automatic transmissions, emergency fuel tanks, and foam rubber seats are also available. Pneumatic tire models are designed specifically for rugged all-weather outside work. Called the Super Yardlifts, these have higher underclearance, tubeless tires with pressures of 30 to 65 psi. Continental engines are used in all gasoline models. — **Clark Equipment Co., Battle Creek, Mich.**

ONE-MAN CAB — The new one-man-cab FWD concrete mixer carrier has six-wheel drive and can transport up to 8 yd of concrete over rugged or soft terrain at off-highway locations, according to the manufacturer. The new FWD,

called the model CS-457, is only 32-in. long from the front axle to the back of the cab, permitting forward mixer location for bigger payloads on the truck's 15,500-lb capacity front axle. According to the manufacturer, it is adaptable to any type of truck concrete mixer.—**Four Wheel Drive Auto Co., Clintonville, Wis.**

DODGE TRUCKS—Dodge is introducing a new line of tandem-axle six-wheel trucks ranging from 31,000 to 46,000 lb gvw and up to 65,000 lb maximum gross combination weight. New V-8 engines ranging up to 220 hp power the new line. The trucks are offered with a wide range of power units and wheelbases. The new tandems are offered with five-speed transmissions as standard equipment, and a complete line of three-speed auxiliary transmissions is available as factory-installed extra equipment. The trucks were designed to weigh less than usual to increase payloads, and to offer maximum flexibility in rough off-the-road operations. — **Dodge Truck Div., Detroit 31, Mich.**



DRILLING TEAM—Gardner-Denver has introduced a new big compressor and a 5½-in. rock drill that add up to a good drilling team. The compressor has an air delivery

"WE MAKE MORE MONEY USING OUR POW-R-DITCHERS"*

*Say Russell Bier and Gene Stewart
BIER & STEWART CONSTRUCTION CO., Palmyra, Missouri
"Our 524T Pow-R-Ditcher makes us more money per dollar invested than any ditching machine on the market. We do better work and our customers are better satisfied. We can underbid when the Pow-R-Ditcher is on the job".

Write for Name of Nearest Dealer & Full Information

Learn about the 524T Pow-R-Ditcher . . . it's ideal for contractors, municipalities, utility companies, etc. Digs 8" to 24" wide, and digs for less because it costs so much less! Self propelled and one-man operated. Smaller Vermeer Pow-D-Ditcher models available.

Some Excellent Sales Territory Available

VERMEER MFG. CO. Pella, Iowa

WEIGH IT ON THE WAY!

make every crane a scale . . .

with MARTIN-DECKER

CRANE WEIGHT INDICATORS

TYPE S8-10 (Illustrated) Combination Load & Radius Indicator with Capacities up to 200,000 lbs.

TYPE S-12 Load Indicator with Capacities up to 200,000 lbs.

TYPE S-6 Low Priced Load Indicator with Capacities up to 50,000 lbs.

TYPE S8-10

These dependable, sensitive, yet rugged weight measuring devices are used throughout the world on Boom Cranes, Bridge Cranes and Overhead Hoists. Piston actuated, the Indicating Scale reads direct on dials. Guaranteed Accuracy of 1% of the Maximum Dial Reading.

Write Dept. AC-6 for descriptive literature.

MARTIN-DECKER CORP.

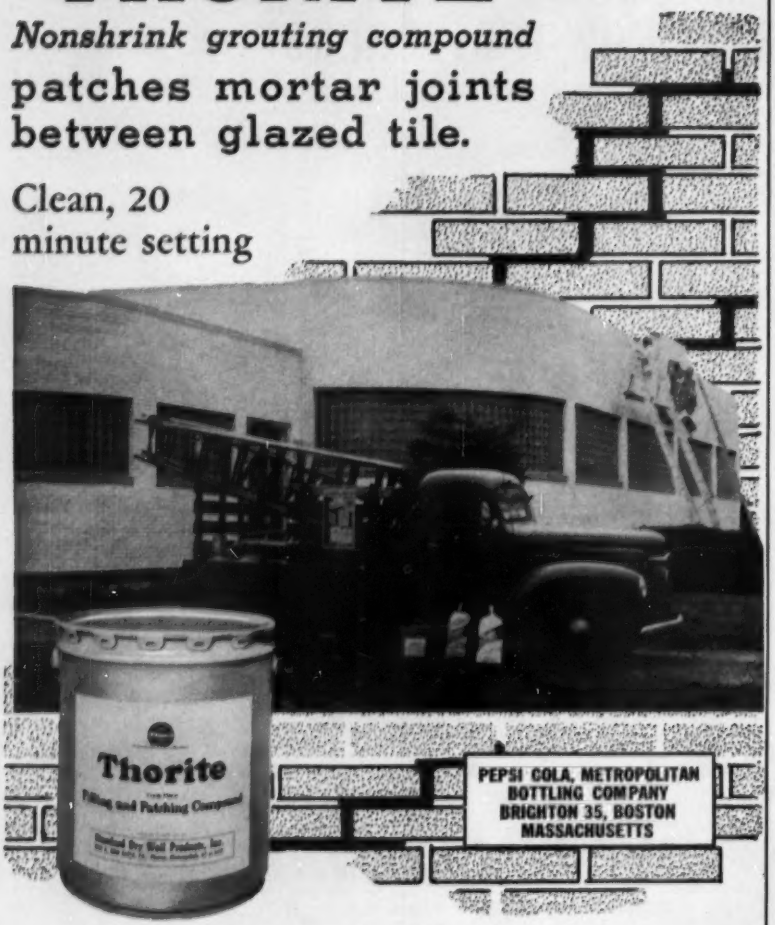
HOME OF THE WEIGHT INDICATOR — LONG BEACH, CALIFORNIA

THORITE

Nonshrink grouting compound

patches mortar joints between glazed tile.

Clean, 20 minute setting



valuable for many uses!

Use THORITE for patching blistered concrete, where reinforcing rods are exposed and corroded, for patching cornices, sills, lintels, belt courses, grain elevators, bridges, underpasses, reservoirs, dams, water filtration plants.

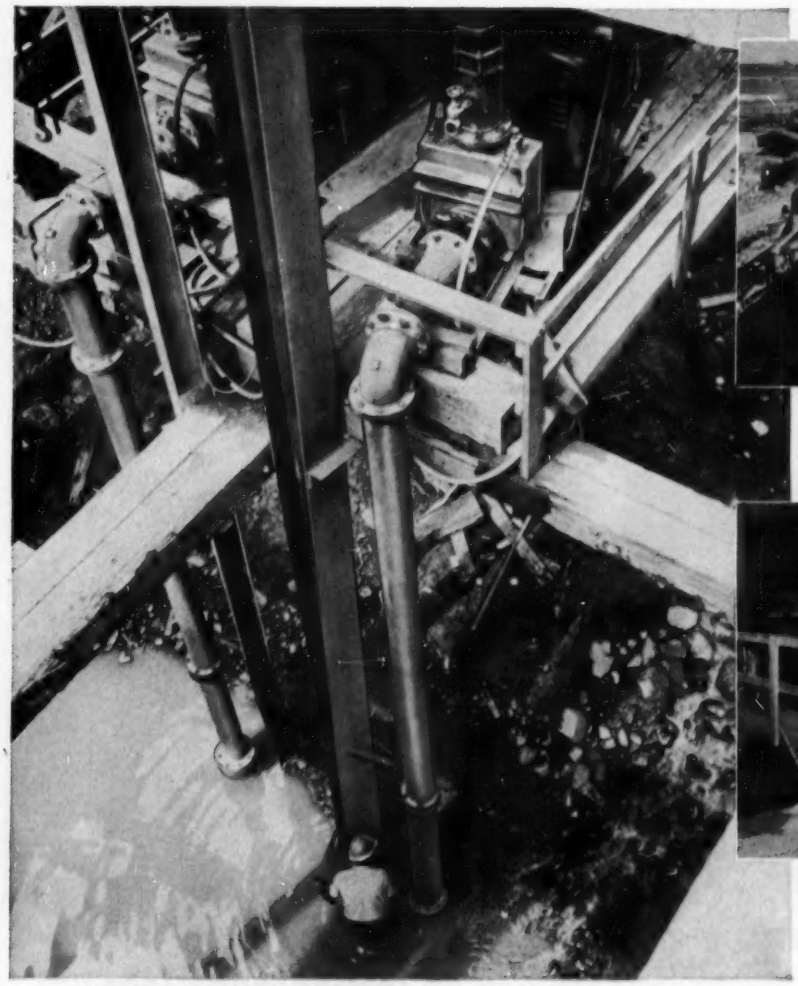
SECURING REINFORCING RODS INTO CONCRETE

Surface and reinforcing rods are sandblasted and thoroughly cleaned. An application of Thorite, by brush, over rods and concrete, previous to filling patch with Thorite, by trowel, is made.

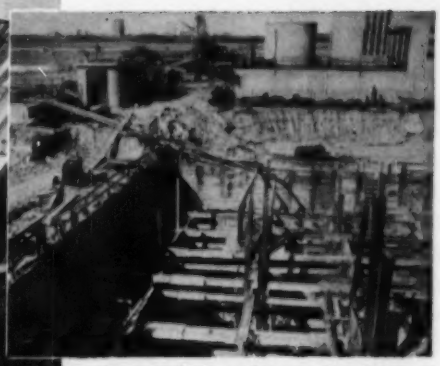
Get our pictorially described literature
"HOW TO DO IT"
STANDARD DRY WALL PRODUCTS INC.
NEW EAGLE, PENNSYLVANIA

rating of 900 cfm. It is a two-stage compressor with normal operating pressure of 100 psi. Similiar in design to the Gardner-Denver rotary 600 model, it features a full water cooling system, a clutch that disengages the compressor for easy engine starting, and a system that circulates hot water through tubes in the heat exchanger and oil reservoir to warm up the oil for immediate oil circulation. The new 5½-in. percussion rock drill, called the model DH 143, is big enough to provide extra power for handling bits up to 5 in. for fast penetration. A line of carburized sectional drill rods, couplings, and shanks has been developed for use with the drill. The DH 143 is furnished with an air-powered crawler mounting that is self-propelled and maneuverable over rough ground. The chain feed drilling mast accommodates 20-ft rod changes, and it can be hydraulically adjusted to drill toe holes at 15 deg below the horizontal. — **Gardner - Denver Co., Quincy, Ill.**

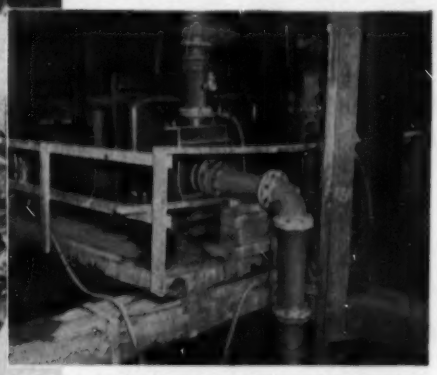
NEW FASTENING TOOL—The Shure-Set is a multi-purpose, manually powered tool designed for fastening jobs too difficult for ordinary hammers, but too easy for power tools. The new tool seats a specially constructed fastener into a variety of materials including concrete, brick, and steel. Worked the same way as driving a cork-supported needle through a coin, the tool eliminates star drilling, toggle bolts, anchors, and concrete nails. Selling for $27.95, it is packaged in a metal carrying kit with long and short collars, ¼-in. and 3/16-in. stud holders, and drive



Deep well is 65 feet below grade and only 100 feet from water front.



A general view of excavation for new pumping building at Bowery Bay Sewage Disposal Plant. The lift is 24 feet and the discharge is through 250 feet of pipe.



A Tachometer placed on these engines showed 1400 RPM, well below the 1800 RPM maximum recommended by the manufacturer. These Model 8F3 Marlows have an AGC rating of 125,000 GPH.

Contractor Handles Seepage 65 Feet Below Grade

PUMPS WORK STEADILY LESS THAN 100 FEET FROM RIVER

PUMPING IS AN important part of the deep coffer dam work proceeding at the Bowery Bay Sewage Treatment Plant in New York City. At a new pumping building, it was necessary for the contractor, J. Rich Steers, Inc., to excavate 65 feet below grade, in a permeable formation less than 100 feet from Bowery Bay.

A constant stream of seepage is controlled by two Marlow 8-inch pumps operating as a team, each running 12 hours on and 12 off. Throttling valves on the discharge lines regulate the flow so that the pumps operate steadily, rather than pumping and priming alternately.

Suction lift on the pumps is 24 feet, but will be reduced to 12 feet as soon as steel is placed and a platform can be built. The present position allows complete freedom for men to work without interference from the pumping equipment.

Pumping started in November 1954 and will continue through 1956. On this $13,000,000 job, there are 11 Marlow pumps, both self-primers and Mud-Hogs. Because of permeable earth, depth of excavation, and water front location, it is essential that the pumps operate dependably.

Need dependable dewatering pumps that will keep your job on schedule — then call your Marlow dealer. Look for his name in your classified phone book, or write for complete information on Marlow pumps . . . and the name of your Marlow dealer.

Marlow PUMPS

S-3898

MARLOW PUMPS

Division of Bell & Gossett Company

RIDGEWOOD, NEW JERSEY

Morton Grove, Illinois Longview, Texas

All-round Dirt-Moving Team

for low-cost operation

LARGE ENOUGH to get jobs done fast—
SMALL ENOUGH for profitable use on low-yardage jobs

HD-11 crawler—75 drawbar hp. Gets more work done faster and at lower cost with these on-the-job advantages: shock-absorbing, all-steel, box-A main frame; rugged final drives that ride on straddle-mounted roller bearings; 1,000-hour lubrication intervals for truck wheels, idlers and support rollers; ceramic-lined master clutch that requires fewer adjustments, provides extra long life; plus new operator convenience that includes a big foam rubber seat and 24-volt direct electric starting.

AC-106 scraper—6.1 yd struck, 7.5 yd heaped. Plenty of features for fast, low-cost dirt moving: curved, offset cutting edge and "center-boiling" loading action; wide, low bowl to keep center of gravity low; high-flotation tires and ample ground clearance; maximum stability for working on slopes or rough terrain; 81-in. apron opening and forward-forced ejection for quick, clean dumping; easy adjustments; simple sheave system.

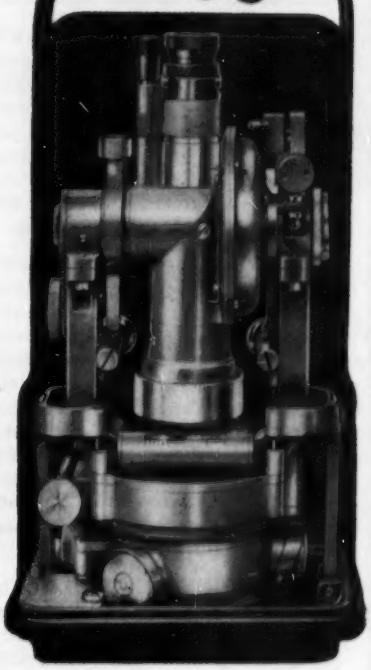
• • •

See these and other important earth-moving advantages of Allis-Chalmers crawler tractor and scraper combinations at your Allis-Chalmers construction machinery dealer. He has complete facilities to serve you—factory-trained servicemen, factory-approved methods and complete stocks of True Original Parts.

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

ACCURACY IN YOUR HAND



Carry a Kern Instrument to assure a better, faster job. Kern's consistent research and experimentation result in functional, supremely accurate Instruments for you; in Instruments for today and tomorrow.

KERN'S DKM 2
one second Theodolite f. Triangulation, big construction and Engineering Operation.

FAST DIRECT READING
To 1", Estimation to 1/10".
All reading from 1 position.

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is highly portable. Weight 6 lbs. Height 7" including Metal Case.

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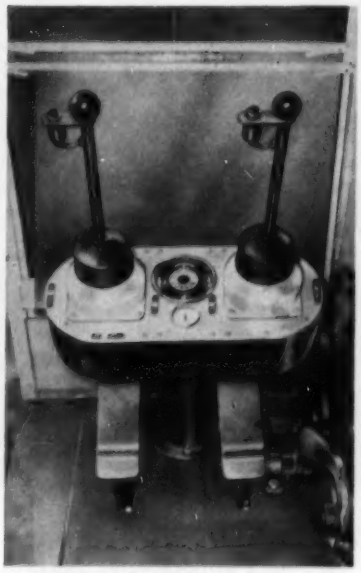
KERN INSTRUMENTS INC.
120 Grand St., White Plains, N.Y.

rods. Fasteners are divided into two main groups: drive pins which sell for $5.25 to $12.25 a hundred and threaded studs which are priced from $7.50 to $10.50 a hundred. The tool is said to be as simple as a hammer and nail to use. The anvil or head of the tool when hit with the hammer drives the supported fastener into the surface. **—Ramset Fastening System, of Olin Mathieson Chemical Corp., Cleveland, Ohio.**



NEW AIR CONTROLS—New air controls available on eight models of Lorain power shovels and cranes operate all friction clutches by fully metered air power. Only two levers are used to control the following operations: boom derricking, boom brake, swing, crowd, retract, hoist, clam holding, drag-in, power load lowering and third drum. The operator has both hands on the levers at all times and by a slight motion to the right or left or forward or back, he can engage any single operation and can also get various combinations. This blending is made possible by a multiple air valve at the base of each lever, which, when opened, applies air through cylinders to engage friction clutches.**—Thew Shovel Co., Lorain, Ohio.**

Equipment Maintenance News...
In CM&E's special July Maintenance Issue, the new equipment section will be devoted to a description of tools designed to facilitate maintenance in the shop and in the field.

FAST, LOW-COST WAY TO INSTALL PIPE . . .

push it under streets, roads, tracks, lawns with a timesaving

GREENLEE HYDRAULIC PUSHER

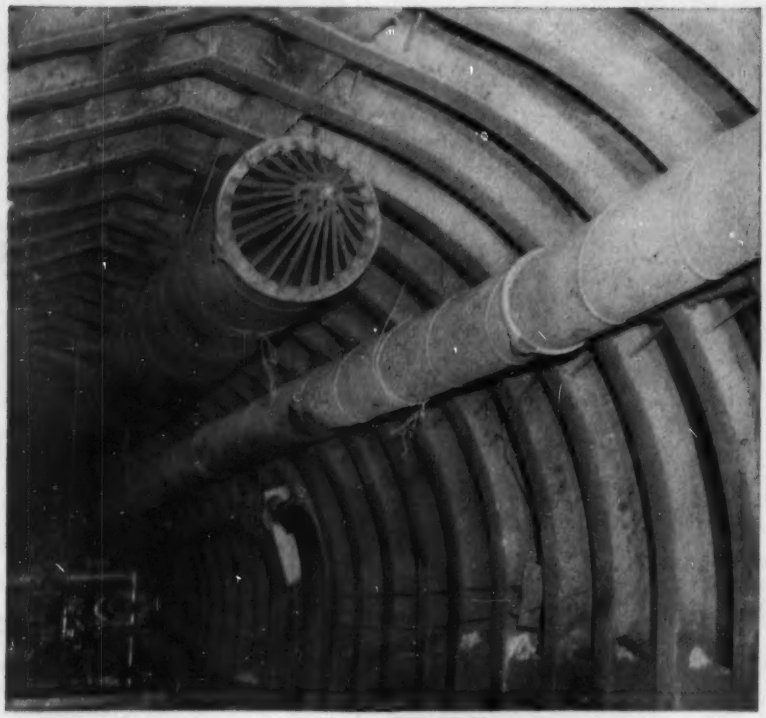
Speed underground piping jobs this way. GREENLEE Pusher is one-man-operated (by hand or with power pump), portable, simple to set up and use. No tearing up of pavement, floors, lawns . . . does away with extensive ditching, tunneling, backfilling, repaving. GREENLEE Pusher cuts job time to a fraction . . . often pays for itself on first job.

Two feet per minute average pushing time
GREENLEE Pushers are available in two sizes: No. 790 for ¾" to 4" pipe . . . No. 795 for pipe over 4", concrete sewer pipe, large ducts. Average performance of No. 790, shown above with power pump, two feet per minute. Write for literature.

GREENLEE

GREENLEE TOOL CO.
2185 Columbia Avenue • Rockford, Illinois

SHORT CUT THAT CUTS COSTS



With the accent on speed in construction work, Naylor pipe has proved a practical help in providing a dependable short cut on ventilating lines.

The combination of this lockseamed, spiralwelded pipe and the one-piece Naylor Wedge-Lock coupling gives you lines that can be installed faster and easier than by other methods. The light weight of the pipe not only speeds the installation but, in addition, the exclusive Naylor structure permits the use of lighter gauge material which reduces costs without sacrificing performance. High salvage and re-use value are other economy factors to consider, too.

For moving air and water and for other materials handling jobs, it will pay you to look into all the advantages offered by Naylor pipe and Naylor Wedge-Lock couplings. Write for Bulletins No. 507 and No. 514.

NAYLOR PIPE

NAYLOR PIPE COMPANY
1268 East 92nd Street
Chicago 19, Illinois

Eastern U. S. and Foreign Sales Office: 350 Madison Avenue, New York 17, New York

New Publications

These catalogs and bulletins from manufacturers contain useful information about construction equipment and materials. To obtain a copy, write directly to the manufacturer at the address given.

PRECAST CONCRETE SYSTEM—Detail drawings and design data are provided in a new 8-p booklet on the Flexicore precast concrete system. Simplified erections, job savings, and complete specifications are explained with text and pictures.—**Flexicore Co., Inc., 1932 Monument St., Dayton 1, Ohio.**

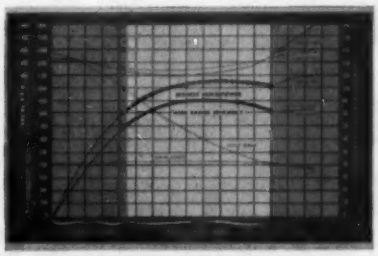
METAL LATHING—The 1956 edition of "Specifications for Metal Lathing and Furring" is now available for distribution by the Metal Lath Manufacturers Association. Covering all types of metal lath construction, the 16-p bulletin includes specifications for solid and hollow partitions, wall furring, metal lath attached to wood, and other applications — **Metal Lath Manufacturers Assn., Engineers Bldg., Cleveland 14, Ohio.**

SOIL-CEMENT TESTING — The new edition of the "Soil-Cement Laboratory Handbook" contains up-to-date information on testing practices. The booklet includes modifications in practice that have reduced testing time by as much as 65% in recent years. Among recent changes discussed are the short-cut procedure for sandy soils, simplification of wet-dry and freezing-thaw tests and methods of testing soils for small projects. Copies are available free upon request.—**Portland Cement Association, 33 W. Grand Ave., Chicago 10, Ill.**

WESTINGHOUSE MIXER—A 16-p bulletin describes the complete line of 1956 Westinghouse Transit mixers. Dimensions and specifications are listed on five new models ranging from 4½-yd to 6½-yd capacities. Also illustrated is the complete line of optional equipment. Among the features described are Westinghouse's fully enclosed drum gear drive, the ball-and-socket front end mounting at the drum, and the double-action mixing drum.—**Westinghouse Transit Mixer Div., LeTourneau-Westinghouse Co., Indianapolis, Ind.**

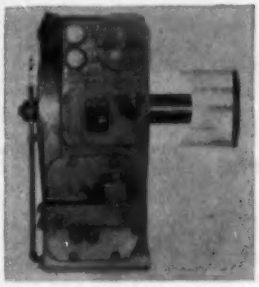
(Continued on page 264)

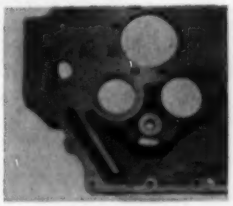
MORE WORK DONE, LESS MAINTENANCE
—these benefits are built in TORCON Torque Converters



* Engine efficiency and torque demand in constant balance...

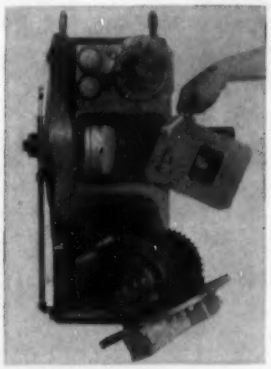
Torcon design provides that the engine will operate at its most efficient speed, with torque multiplication to meet constantly changing demands. Torcon blade design eliminates cavitation, assures high efficiency throughout a wide working range.





* Integrated oil system...

Oil sump is an integral part of the housing casting—an important advantage. Internal oil passages are cast in the housing—reducing the number of parts, eliminating unnecessary hoses and fittings, preventing leakages that impair efficiency. Oil flows automatically to lubricate all working parts.



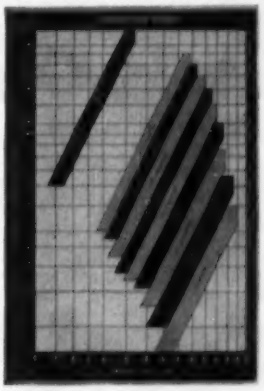
* Easy accessibility...

Ample sized cover plates are easily removable for quick inspection—no special tools required. Regulating valves are mounted on the outside of the housing, for immediate inspection.

* A complete line—15 to 600 HP

Torcon torque converters include mass-produced standard package units available to equipment manufacturers and to owners and operators for field installation.

A broad range of wheel diameters and options assures a unit that can be fitted readily into any power-transmission system.



THIS BULLETIN WILL BE HELPFUL

A brief, clear statement of Torcon features—well illustrated. Use the coupon.

CLARK EQUIPMENT COMPANY, Transmission Division
Falahee Road, Jackson 6, Michigan
Please send me the Torcon Bulletin

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CLARK® EQUIPMENT

CLARK EQUIPMENT COMPANY
Jackson, Michigan

* Miller "BT" 10 ton Tandem axle $1,635.00* F.O.B. Milwaukee
Any optional equipment extra
*Plus Freight and 8% Federal Tax

equipment "commutes" faster, cheaper by MILLER *Tilt-Top*!

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NEW PUBLICATIONS...
Continued

GUNNING EQUIPMENT—A new 16-p catalog contains answers to many of the questions often asked about air placed or gunned concrete. Also included are several pages of actual job application photos showing Air Placement's complete line of concrete gunning equipment. A description of the new Airplaco portable concrete gunning rig, a combination of equipment which forms a complete unit capable of handling construction, maintenance and restoration jobs, is also included.—**Air Placement Equipment Co., 1009-11 W. 24th St., Kansas City 8, Mo.**

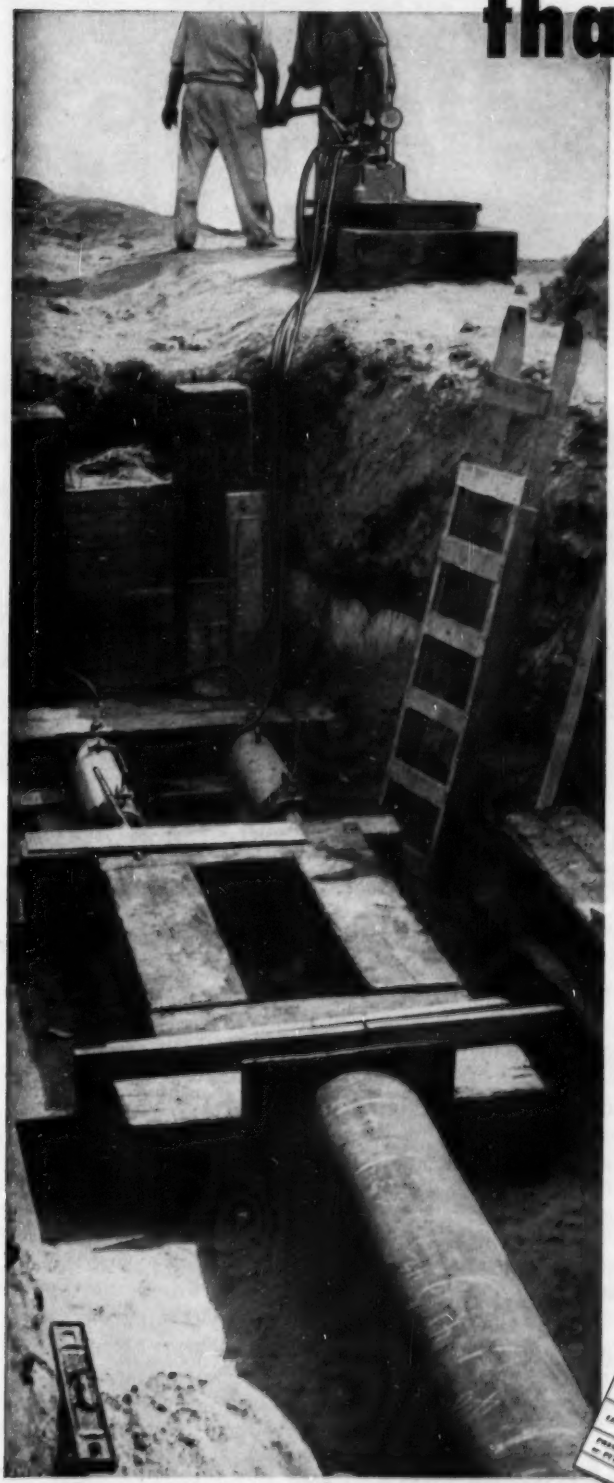
SAFETY HOOKS—A new 4-page bulletin covers new models of Bullard-Burnham safety hooks. It contains photographs of hooks and connectors, and explains their applications on hoists and cranes. Data is provided on hooks covering load capacities from 1,000 to 50,000 lb.—**E. D. Bullard Co., 275 8th St., San Francisco, Calif.**

"DRAGSCRAPERS" — Sauerman Bros.' new catalog gives full details and specifications on Drag-Scraper machines. Parts one and two of the catalog cover standard installations for 1/3 to 3-yd and parts three and four describe "Rapid Shifting" DragScrapers in sizes 1/3 to 5 yd. Track cable machines and tower excavators are described in another section. Each section includes several pages of job photos to illustrate the items specified.—**Sauerman Bros., Inc., 612 S. 28th Ave., Bellwood, Ill.**

FUEL INJECTION EQUIPMENT—"Something Special" is the title of a new booklet released by Caterpillar Tractor Co. to describe the manufacturing process of their fuel injection equipment. The eight page booklet is amply supported by pictures of each operation. Ask for bulletin No. DE 606. —**Caterpillar Tractor Co., Peoria, Ill.**

RADIO COMMUNICATION—"Increased Profits for Concrete Producers through Complete Control of Ready Mixed Trucks with RCA 2-Way Radio" describes case histories to make its point. In addition, the booklet outlines the principal features of RCA equipment

It costs less to PUSH PIPE than dig ditches



cut job costs and installation time . . .

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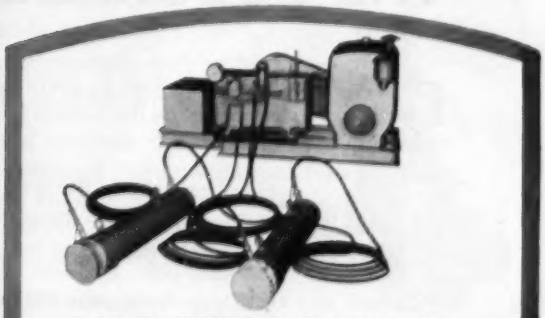
Photo shows a public utilities crew pushing a 16″ diameter steel pipe in 16-foot sections through 44 feet of earth. Two 150-ton capacity, 30-inch ram travel, double-acting Rodgers Jacking Cylinders are doing the job. A hand operated Rodgers Hydraulic Pump furnishes equal power to both jacks.

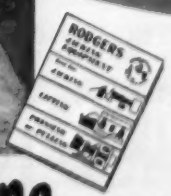
Rodgers Jacking Cylinders used singly or in groups provide steady, precisely controlled power to jack steel casing, corrugated pipe or compressed concrete tile—and they can be used for all types of accurately controlled lifting operations on structures.

Rodgers Jacking Cylinders are available in capacities from 50 to 600 tons with standard ram travels from 6 inches to 48 inches. Longer ram travels to 72 inches available on special order. Tunnel contractors are invited to inquire about our special hydraulic equipment for tunnel shield construction which includes a series of special hydraulic cylinders, power pumps and controls.

A selection of hand or power operated Rodgers hydraulic pumping units offer the exact jacking combination needed for your job. Let Rodgers engineering department assist you in your selections.



Rodgers Two Cylinder Power Driven Jacking Unit
MODEL NO. J150 A2 — 48 — D2



Send for your free copy of Rodgers Bulletin, 317A.
It contains a complete description of Rodgers Hydraulic jacking units, quick couplers, valves and hoses, also a description of hydraulic equipment used in the construction of tunnel shields.

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THE COLORADO RIVER AQUEDUCT

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NEW PUBLICATIONS ...
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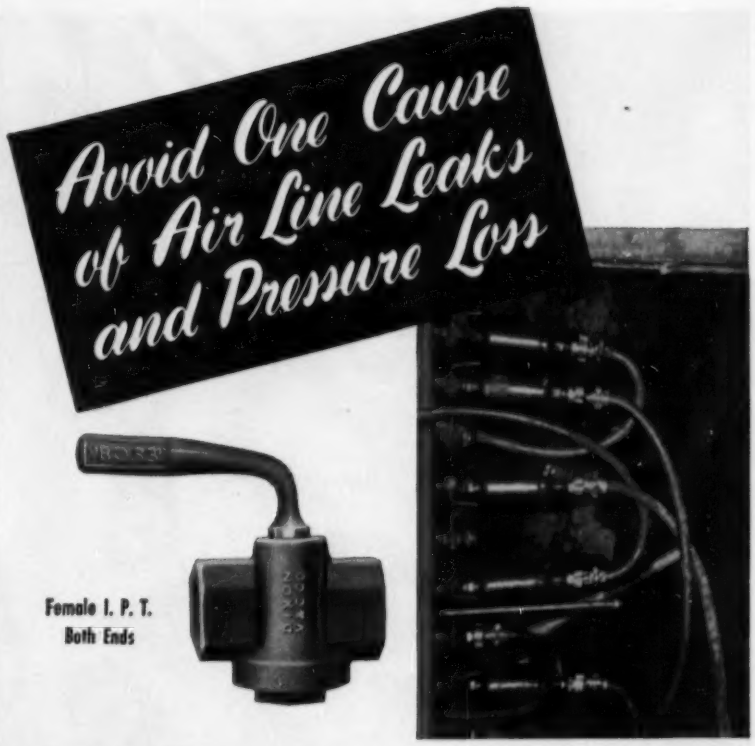
specially designed to meet the requirements of ready mix fleets, and describes RCA's 4-point protection program including nationwide service by factory-trained technicians.—**R. Z. LaTerza, Building 15-1, RCA, Camden 2, N. J.**

WELDING INFORMATION — A new 16-p "Picture Book of Facts on Eutectic's Welding Processes" is designed to give welders information on the "low heat input" metal-joining process. According to Eutectic, this process combines the advantages of low application heats of brazing with the greater strength of fusion welding. A series of tests conducted by an independent testing laboratory are also discussed.—**Eutectic Welding Alloys Corp., 40 172nd St., Flushing 58, N. Y.**

CONCRETE HANDLING EQUIPMENT — A well-illustrated 34-p catalog contains detailed specifications for more than 300 items of concrete handling equipment manufactured by the Gar-Bro Mfg. Co. Included is information on concrete buckets, chutes and hoppers, bucket attachments, powered crane hooks, carts, bins and batchers, bin gates, paving vibrators, splicing rigs and many other pieces of equipment. Ask for catalog No. 300.—**Gar-Bro Mfg. Co., 2415 E. Washington Blvd., Los Angeles, Calif.**

MANAGEMENT SUGGESTIONS —"Absenteeism" is the title of a new service bulletin issued by the Occupational Health Institute, Inc. The booklet is designed to guide management and labor toward a possible alleviation of lost time. It is estimated that employee absenteeism costs industry $10 billion a year, the bulletin states. —**Occupational Health Institute, Inc., 6 E. 39th St., New York 16, N. Y.**

BEARINGS—A new 72-p catalog on Shafer self-aligning roller bearings contains specifications and other data on models ranging from ¾-in. shaft sizes to 7-in. shafts. The catalog describes Shafer's self-aligning principle of concave rollers running between convex raceways. Also included is completely revised engineering data, new load rating tables, and exploded views for parts identification. — **Chain Belt Co., Milwaukee 1, Wis.**



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Built to withstand the hard knocks of mining and construction service, "BOSS" Valves are also ideal for general use on pipe lines, hose lines, compressor tanks, etc., and for the handling of water. They do not require packing.

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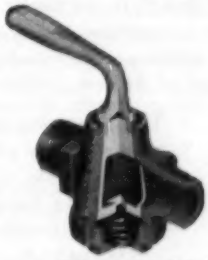
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Northwestern Fire & Marine Insurance Company
Twin City Fire Insurance Company . . . *Minneapolis 2, Minnesota*

CONTRACTS AWARDED

Continued from page 36

for W. R. Grace & Co., 7 Hanover Square, New York, N.Y. $18,000,000.

Foundation Co., 57 William St., New York 5, N.Y. Power plant building to house 4th generating unit, New Castle Power Plant, New Castle, Pa. for Pennsylvania Power Co, 19 E. Washington St., New Castle, Pa. $17,500,000.

George A. Fuller Co., 597 Madison Ave., New York 22, N.Y. Insulating board plant near Klamath Falls, Ore. for Johns-Manville Corp., 22 E. 40th St., N.Y.C. $12,000,000

Turner Construction Co., 420 Lexington Ave., New York 17, N.Y. Six 2 to 5-story hospital buildings, Power Plant, Greenspring and Belvedere Aves., Baltimore, Md. for Associated Jewish Charities, Eutaw and Monument Sts., Baltimore 1, Md. $12,000,000.

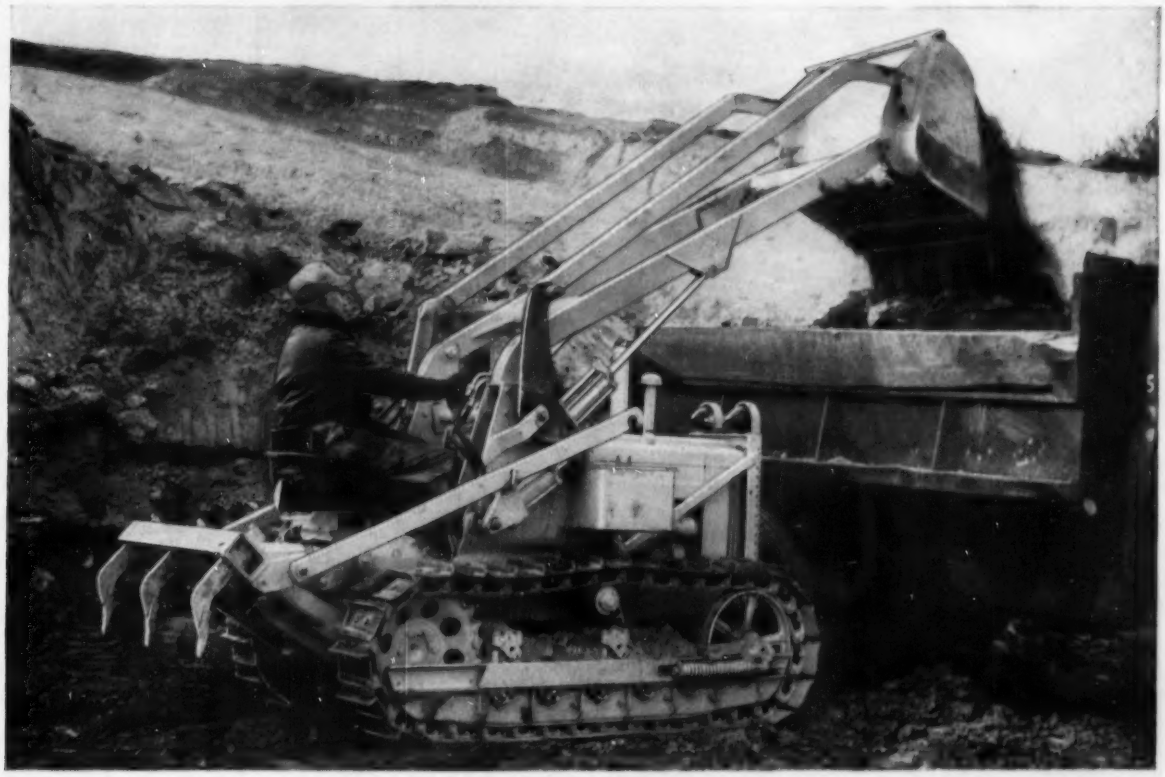
General Electric Co., River Rd., Schenectady, N.Y. Unit No. 5, 325,000-kw turbine-generator unit at St. Clair Power Plant, Michigan for Detroit Edison Co., 2000 Second Ave., Detroit 26, Mich. $10,000,000.

George A Fuller Co., 11 Beacon St., Boston, Mass. Factory in Wauregan Section east of Junction Rtes, 12 and 202, Plainfield, Conn., for American Radiator & Standard Corp., 40 W. 40 St., N.Y.C. $8,000,000.

Paul Tishman Co., Inc., Construct and Finance 21 E. 70 St., New York, N.Y. Family housing, 505 units, Otis Air Force Base of Falmouth, Mass. Purchasing and Contracting office, Otis Air Force Base, Falmouth, Mass. $6,813,996.

Sheehan Pipe Line Construction Co., National Bank of Tulsa Bldg., Okla. A 90-mi, 14-in. seamless steel petroleum products pipe line from Twin Oaks, Pa. to Plainfield, N.J. for Sun Pipe Line Co. (Sun Oil) 1608 Walnut St., Phila, Pa. $5,000,000.

Lycoming Construction Co., 127 Susquehanna St., Williamsport, Pa. Construct Penn Forest Dam and reservoir and appurtenant work in connection with Wild Creek Gravity Water supply system, Bethlehem, Pa. for Bethlehem Authority, 6 W. Broad St., Bethlehem, Pa. $4,725,315.



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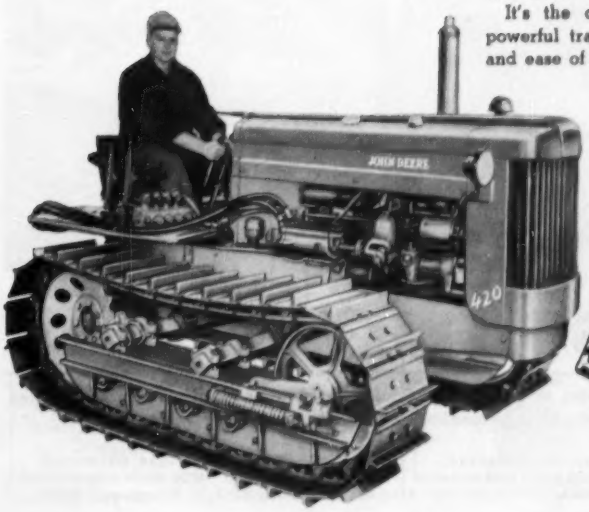

Left: The new "420" Crawler with 4-roller tracks. Also available with 5-roller, above. Both tractors now have 20 per cent more power than previous models.

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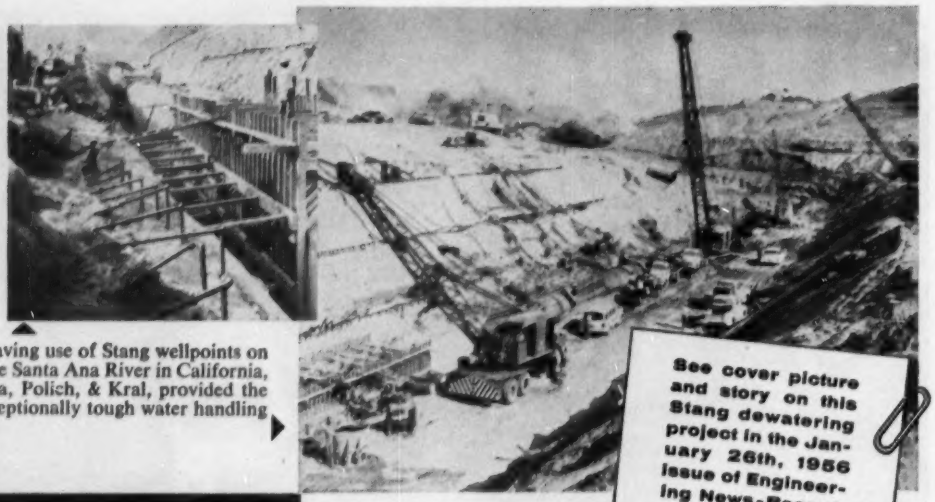

This time and money-saving use of Stang wellpoints on a pipeline crossing of the Santa Ana River in California, for contractor Ukropina, Polich, & Kral, provided the ideal solution to an exceptionally tough water handling problem.

See cover picture and story on this Stang dewatering project in the January 26th, 1956 issue of Engineering News-Record.

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562

Advertisers in this Issue

Number of copies of this issue printed 44,529

A

Alemite Div., Stewart Warner Corp. 155
Allis-Chalmers (Construction Machy. Div.) 6, 140, 145, 260
American Bitumuls & Asphalt Co. 252
American Bosch Arma Corp., American Bosch Div. 166, 167
American Bridge Div., U. S. Steel Corp. 143
American Gear & Mfg. Co. 198
American Hoist & Derrick Co. 156, 157
(Thomas Laughlin Div.) 256
American Manganese Steel Div., American Brake Shoe Co. 200
American Road Equipment Co. 236
American Steel & Wire Div., U. S. Steel Corp. 115, 116, 117, 118
American Steel & Wire Div., U. S. Steel Corp. 207
Armco Drainage & Metal Pdts., Inc. 246
Athey Products Corp. 80, 81
Atlas Powder Co. 37
Austin-Western Works (Const. Equip. Div., Baldwin-Lima-Hamilton Corp.) 22, 23

B

Baldwin-Lima-Hamilton (Construction Equipment Div.) 127
Barber-Greene 28
Bay City Shovels, Inc. 235
Beaver Pipe Tools, Inc. 244
Bethlehem Steel Co. 174, 240, 274
Black & Decker Mfg. Co. 232
Blackhawk Mfg. Co. 201
Blaw-Knox Co. (Construction Equipment Div.) 129
Borne, Scrymser Co. 196
Broderick & Bascom Rope Co. .... 2nd Cover
Bucyrus-Erie Co. 83
Buffalo-Springfield Roller Co. 273
Butler Bin Co. 277

(Continued on page 272)

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#33 of a Series

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As photo shows, points did not cross highway but were placed along its sides and thus performed their unusual feat despite a huge gap in-between. What problem can advanced Griffin methods solve for *you?*

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Advertisers Index

Continued from page 271

C

C & D Division Yuba Mfg. Co. 243
Caterpillar Tractor Co. 19, 31, 67, 70, 71, 75, 79, 132
Chain Belt Co. (Construction Machy. Div.) 158
Chevrolet Motor Div., General Motors 162
Chisholm Moore Hoist Div., Columbus McKinnon Chain Corp. 252
Chrysler Corp. (Ind. Engine Div.) ..... 3rd Cover
Cities Service Oil Co. 25
Clark Equipment Co. (Automotive Div.) ..... 139, 263 (Construction Machy. Div.) 146, 147, 177
Cleveland Trencher Co., The 271
Clipper Mfg. Co. 39
Commercial Shearing & Stamping Co. 218
Construction Machinery Co's. 138
Continental Motors Corp. 214

D

D-A Lubricant, Inc. 242
Deere & Co., John 269
Detroit Diesel Engine Div., General Motors 204, 205
Dixon Valve & Coupling Co. 267
DuPont deNemours & Co., Inc. (Textile Fibers Dept.-Nylon Tire Cord) 152 (Zerone-Zerex Section) 96, 97

E

Eaton Mfg. Co. (Axle Div.) 195
Eimco Corp., The 210
Ellis Mfg. Co., Inc. 275
Euclid Div., General Motors Corp. 8, 9

F

Felker Mfg. Co. 141
Foster Co., L. B. 4
Fuller Mfg. Co. (Transmission Div.) 128

G

Gardner-Denver Co. 90
Garrett Corp., The (AiResearch Industrial Div.) 182
Gar-Wood Industries, Inc. (Findlay Div.) 170, 171, 250
General Tire & Rubber Co., The 136
GMC Truck & Coach Div., General Motors 88, 89
Goodall Rubber Co., Inc. 247
Goodrich Industrial Products Co., B. F. 1
Gorman-Rupp Co. 5
Greenlee Tool Co. 261
Griffin Wellpoint Corp. 272
Gulf Oil Corp. 137

H

Hartford Fire Ins. Co. Hartford Accident & Indemnity Co. 268
Hawkinson Co., Paul E. 203
Heltzel Steel Form & Iron Co., The 178, 179
Hobart Brothers Co. 264
Hobbs Corp., John W. 248
Homelite Div., Textron American, Inc. 122, 123
Hough Co., The Frank G. 124, 125
Hyatt Bearings Div., General Motors 98

I

Ingersoll Rand Co. 266
Inland Steel Co. 47, 48, 49, 50
Insley Mfg. Co. 163
International Harvester Co., Inc. (Drott Div.) ..... 187 (Industrial Power Div.) 188, 189, 190, 191, 192, 193, 194

J

Jackson Mfg. Co. 203
Jackson Vibrators, Inc. (Electric Tamper & Equip. Co.) 238
Jaeger Machine Co., The 40
Johns-Manville 224, 253
Jones & Laughlin Steel Corp. 91
Joy Mfg. Co. 68

K

Kelley Machine Div., Wiesner-Rapp Co., Inc. 237
Kern Instruments, Inc. 261
Koehring Co. 16, 17

L

LaCrosse Trailer Corp. 255
Lehigh Portland Cement Co. 43
Leland Equipment Co. 227
LeRoi Division, Westinghouse Air Brake Co. 181
LeTourneau-Westinghouse Co. 100-113
Lincoln Electric Co. 245
Link-Belt Speeder Corp. 221

(Continued on page 275)

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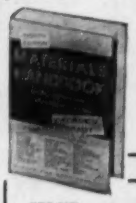

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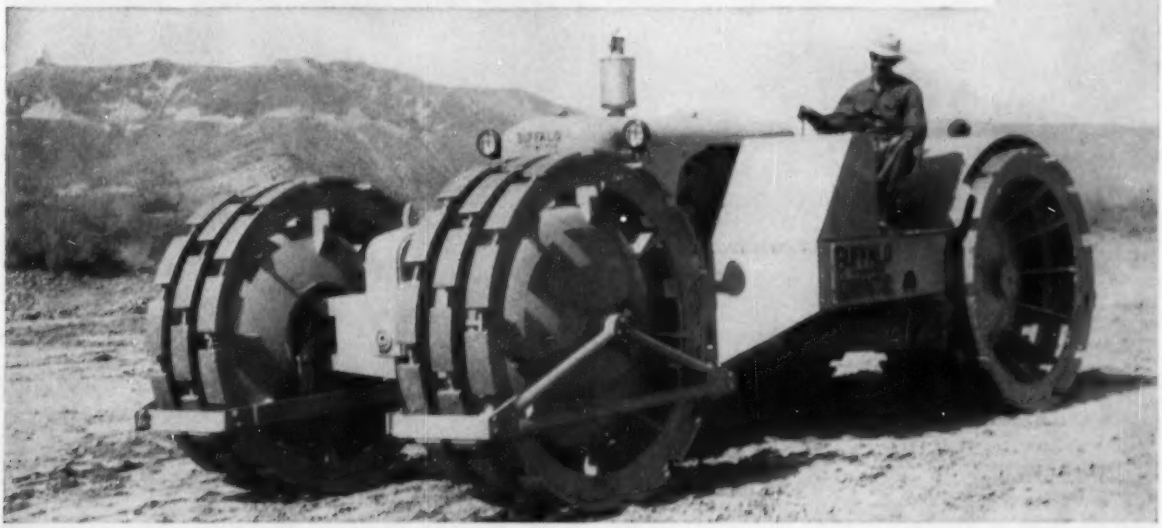
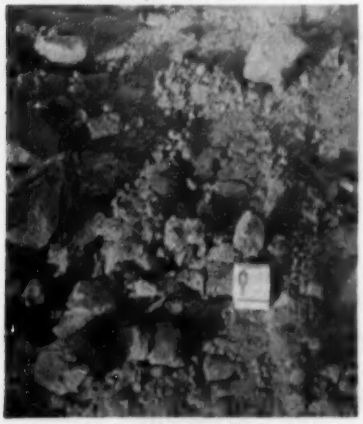


for Guy F. Atkinson Company on $1,736,000 Ventura-to-Ojai highway construction job

To meet density specifications and *speed* compaction, Guy F. Atkinson Company of South San Francisco, California, uses the Buffalo-Springfield K-45 Kompactor on this project between Ventura and Ojai, California.

Material before compaction on the Ventura-Ojai highway job. (Pack of cigarettes shows comparative size.)



After 3 passes by the K-45 Kompactor. Note surface uniformity. (Cigarette pack for comparison.) Density specifications also have been met in record time.

Operating at *fast* speeds, 4 to 5 mph, the self-propelled, highly maneuverable K-45 cuts compaction time substantially from that normally required. It further shortens time by giving compaction to meet specified densities with *fewer* passes.

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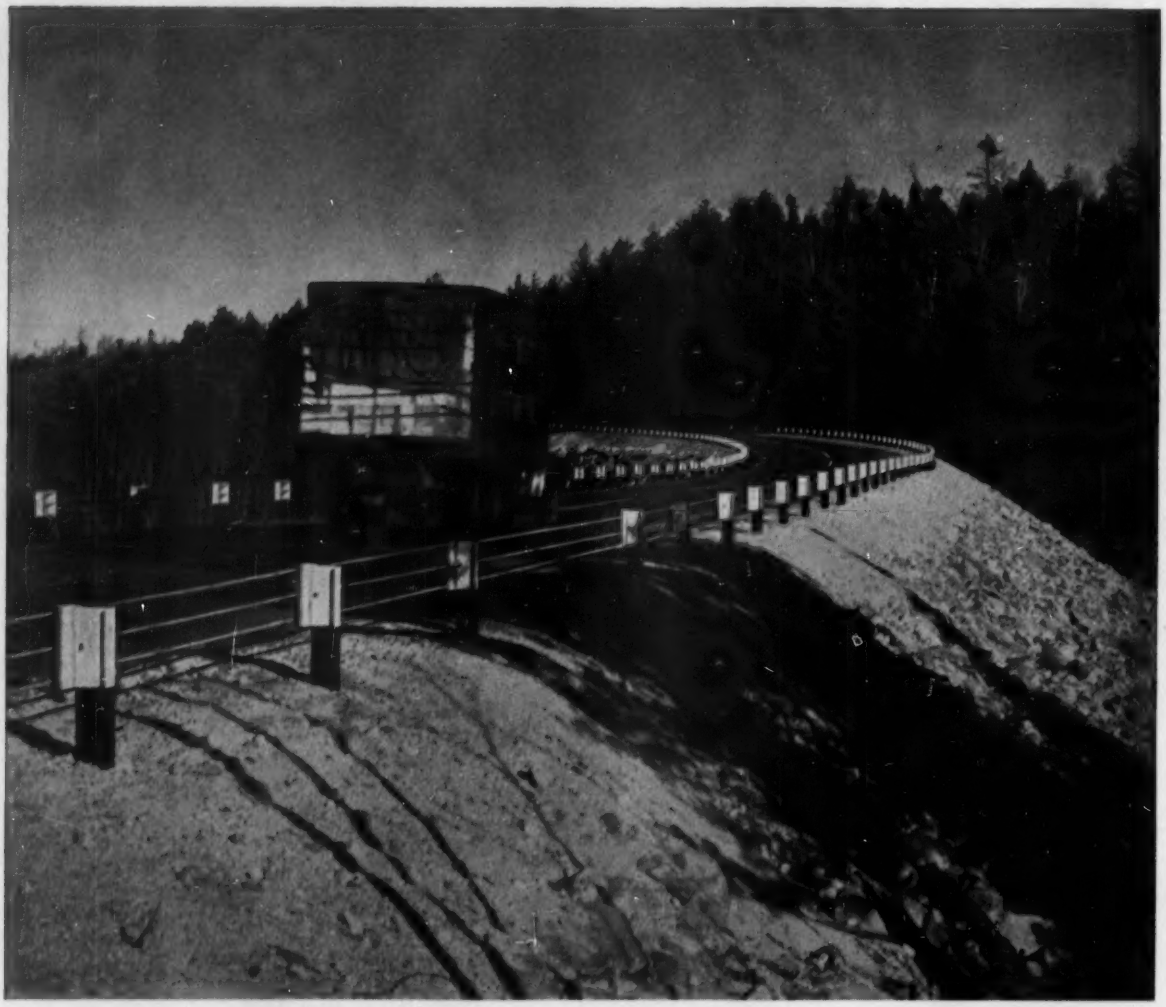

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Used at sharp turns, embankments, bridge approaches and other danger spots along the highway, Bethlehem Cable Guard Rail forms a strong, effective barrier, with high resiliency and impact-absorbing qualities.

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BETHLEHEM STEEL

BETHLEHEM STEEL

Advertisers Index

Continued from page 272

M

Mack Motor Truck Corp. 225
Macwhyte Co. 3
Madesco Tackle Block Co. 275
Malsbary Mfg. Co. 24
Manitowoc Engineering Corp. 134
Marlow Pumps Div., Bell & Gossett Co. 259
Martin-Decker Corp. 257
Master Vibrator Co. 142
McCarter Iron Works, Inc. 35
McGraw-Hill Book Co. 272
Miller Tilt-Top Trailer Co. 264
Moretrench Corp. 173

N

Naylor Pipe Co. 262
Noble Co. 226
North America, Insurance Co. of 215
Northwest Engineering Co. 7

O

Owen Bucket Co. 208

P

Patent Scaffolding Co., Inc., The 131
Prehy Co. 220
Prime-Mover Co., The 249
Pure Oil Co., The 95
Purolator Products, Inc. 254

R

Raybestos-Manhattan, Inc. (Manhattan Rubber Div.) 222
Reo Motors, Inc. 26, 27
Richmond Screw Anchor Co., Inc. 183
Rodgers Hydraulic, Inc. 265

S

Seaman-Andwall Corp. 150, 151
Sheppard Co., Inc., R. H. 32
Sherman Products, Inc. 86
Sinclair Refining Co. 202
Skil Corp. 209
Skookum Co., Inc., The 227
Smith & Co., D. B. 227
Smith Co., The T. L. 44
Snap-On Tools Corp. 18
Standard Dry Wall Products, Inc. 258
Standard Oil Co. of Calif. 83
Standard Oil Co. (Indiana) 212, 213
Stang Corp., John W. 270
Sterling Wheelbarrow Co. 220
Stow Mfg. Co. 186
Superior Concrete Accessories, Inc. 72
Symons Clamp & Mfg. Co. 2

T

Terry Steel Contractors, Inc. 135
Texas Co., The 10, 11, 133
Thermoid Co. 149
Thew Shovel Co., The 121
Thurman Machine Co. 126
Timken-Detroit Axle Div., Rockwell Spring & Axle Co. 230, 231
Timken Roller Bearing Co. ..... 4th Cover
Tractor Spreader Co. 148
Tsubakimoto Chain Mfg. Co., Ltd., The 144
Twin Disc Clutch Co. 216, 217

U

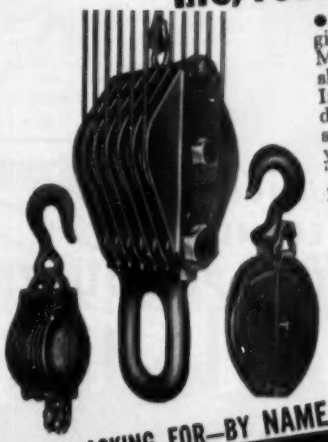
Union Oil Co. of Calif. 184
Union Wire Rope Corp. 160, 161
Unit Crane & Shovel Corp. 20
United States Rubber Co. (Mechanical Goods Div.) 239
Universal Atlas Cement Co. 12
Universal Form Clamp Co. 175

(Continued on page 276)

Insurance Series Reprints Available

The contractor spends about 10% of his overhead on insurance, yet he probably knows less about insurance than anything else he buys. Edward G. Armitage, a construction insurance specialist, has written a concise, easily understood analysis of contractors' insurance problems for CM&E. Copies are 25¢. Address requests to the editor.

Correctly engineered to bear heavier loads, lengthen rope-life, reduce maintenance costs



• Because they're designed and engineered for specific tasks, you'll find MADESCO blocks with heavy steel shells and fittings your *safest* choice. In materials, in construction too, Madesco tackle blocks assure you the extra service that comes from over thirty years of specialized experience and "know-how." Buy Madesco blocks and you make substantial savings on your rope costs, because Madesco sheaves (of iron or steel graphite bronze) are correctly-grooved to prolong rope-life. Loads travel smoothly, easily, quickly to save lifting time; that means savings too that come from minimized maintenance and down-time. There's a complete line of Madesco tackle blocks for every need. Consult your industrial distributor—and meantime write for our catalog.

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MADESCO TACKLE BLOCK CO., Easton, Pa.

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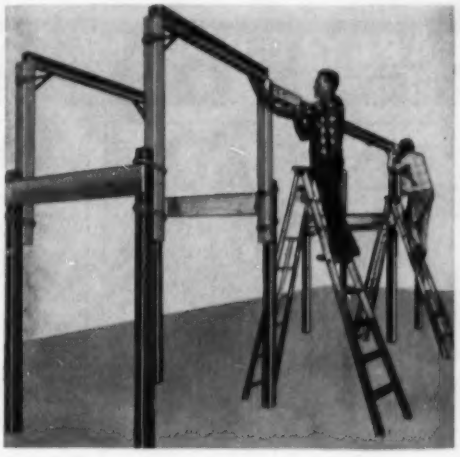

THE NEW 5' U-PURLIN ASSEMBLY goes up quickly to make a corner or end unit of shores-with-purlin. Easily assembled on the ground and erected in the inverted U position, two 5' U-Purlin assemblies can be joined with a horizontal brace, as shown in the photo, since Ellis Shores can be nailed at any point. With a similar unit at the other end of the line, purlins with slip-in shore-holders attached can be added between (seated on ledges and cleated) to form a line of desired length. Since slip-in shores can be used under all of the in-between purlins, tremendous savings of time and labor are assured!

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[C.M.]

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56 Years in the Manufacture of Concrete and Glass Mixers

Advertisers Index

Continued from page 275

V

Vermeer Mfg. Co. 257
Viber Co. 228
Vibro-Plus Products, Inc. 241

W

Waco Manufacturing Co. 242
Wagner Electric Corp. 236
Wagner Iron Works, Inc. 15
Weatherhead Co., The 82
White Mfg. Co. 248
Whiteman Mfg. Co. 199
Wickwire Spencer Steel Div. Colorado Fuel & Iron Corp. 34
Willison Products Div., Ray-O-Vac Co. 251
Willys Motors, Inc. 69, 148
Winslow Engineering Co. 21
Wisconsin Motor Corp. 130

■

CLASSIFIED ADVERTISING

F. J. Eberle, Ass't Mgr.

Employment Opportunities 276
Educational 276
Equipment (Used or Surplus New)
For sale 276

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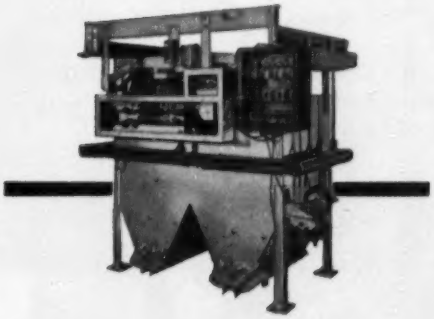

2½ batches a minute more than satisfies the hunger of two 34E dual drum pavers — yet is the production pace which the BUTLER 0-1-0 readily achieves. Only one man — stationed at the cement batcher — to touch a simple set of push buttons — operates any one, two or all three plants.

Master controls for each batcher are pre-set for any specified batch proportion. These are not touched again until the specification changes . . . Gates are completely interlocked, cannot discharge until correct weights are in the hopper and the batcher cannot be charged until the previous batch is cleared. Every batch is the same . . . no errors, no slow down through operator fatigue.

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As your first step toward BUTLER 0-1-0 ownership send for this illustrated Bulletin completely describing the advantages. Get ready — now. Send for Bulletin 0-1-0 today.

BUTLER BIN COMPANY

949 BLACKSTONE AVENUE

WAUKESHA, WISCONSIN

Methods Memo . . .

Good Work

One of the most successful apprenticeship programs in the construction industry—or any other industry—is that conducted by the Bricklayers, Masons, and Plasterers International Union. In cooperation with contractors and manufacturers of brick and tile, the union has trained 49,000 bricklayer apprentices in the last five years. An additional 12,000 now are in training.

The union's eighth annual bricklayer apprentice competition has just ended. Robert G. Neasham of Santa Clara, Calif., won out over 37 other apprentices in a six-day elimination contest to become Champion Bricklayer Apprentice of 1956. The competition, of course, helps arouse interest in the trade and encourages apprentices to develop a high degree of skill. It also illustrates the planning and effort it takes to build an apprenticeship program. This union and those who work with it are making a solid contribution to the industry.

Report from Poland

The North Dakota AGC chapter reports that engineers in Poland have designed and built a machine that lays 60,000 bricks an hour. It is electrically powered, and one man can operate it. The machine spreads mortar, makes spaces for doors and windows, and works efficiently on walls of any height or thickness. The chapter published this report from behind the iron curtain in its publication, "Construction News," then it added skeptically, "That's quite a pile of b-b-b-bricks!"

Safety Award

CONSTRUCTION METHODS AND EQUIPMENT has won a 1955 Public Interest Award from the National Safety Council. The organization makes awards annually to newspapers, magazines, radio and TV stations, and advertisers for exceptional services to safety. We are happy to be selected for this award. We are happier, still, that we have been able to help our readers avoid costly accidents.

Two New Tools

Army Engineers are testing two portable earth augers designed to dig deeper and faster. Both were developed by H. B. Williams Manufacturing Co., Dallas, Texas. The larger weighs about 50,000 lb. It is powered by a 192-hp gasoline engine and is capable of digging holes up to 9 ft in dia and 75 ft deep. The unit is 89 ft long in traveling position on a 25-ton low bed trailer. A turntable permits digging and discharging spoil from either side of the trailer. Augers, auger buckets for wet material, and core barrels for drilling in rock are standard attachments. In sandy loan, the auger digs an average of 6 in. per min.

The smaller auger measures 34 ft long and weighs 24,448 lb. It can dig holes 6 ft in dia and 22 ft deep.

Public Relations

Sidewalk superintendents seldom have it so good as they do at the site of the 38-story Seagram Building under construction on Park Avenue in New York. Safety Plexi-glass portholes, graduated in height for tall, medium, and short sidewalk superintendents, give a view of construction in all directions. A loudspeaker placed over each group of three portholes broadcasts music, comment, and descriptions of the work by Steve Allen, Will Rogers, Jr., Fay Emerson, and others.

And that's not all. For the convenience of visitors from Europe and South America, there also are broadcasts in both French and Spanish.

Downhill Reach

Construction of this section of Topanga Canyon Boulevard in San Fernando Valley, Calif., was a tough job. Within a distance of about 200 ft, the contractor had to put in a 100-ft fill and make a 160-ft cut. To finish the faces of these steep slopes, subcontractor Ed Waters of Van Nuys, Calif., attached an 18-ft extension boom to a multi-purpose Gradall. A ripper tooth removes rocks from the slopes. General contractor on this section of the road is Lowe & Watson, San Bernardino, Calif.

dry up and blow away!

PHOTO COURTESY MARLOW PUMPS, RIDGEWOOD, NEW JERSEY

Chrysler-powered pumps de-water 1¾ mile long area for blasting rocks from St. Lawrence Seaway

Blast those rocks! And that's exactly what they're going to do at Ogdensburg, New York. But since the rocks are at the bottom of the St. Lawrence River, the area must first be "dried up" to permit blasting.

It isn't an easy job, but it's a vital one. Rocks *must* be dynamited out of their centuries-old resting places if the St. Lawrence Seaway Project is to proceed as scheduled. Giant cofferdams, extending from offshore islands to the mainland, have been built, and to date more than 400 million gallons of water have been removed from the area.

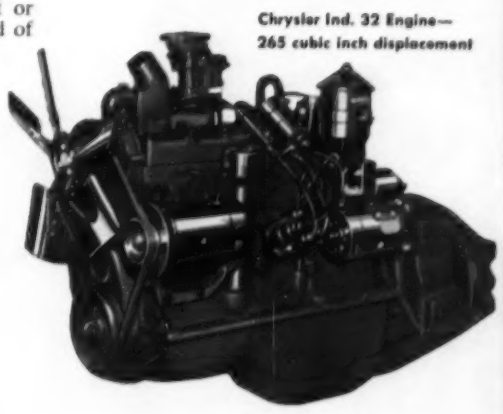
In the performance of this remarkable feat, three Marlow 1061 self-priming centrifugal pumps have been operating around the clock for thirty days, never stopping. The Chrysler Ind. 32 Engine powering each pump is fueled while running. The pumps are delivering about 2500 gallons per minute, running at a speed of 1450 RPM, with a suction lift of twenty feet and a discharge head of twenty-five feet. Engineers working at the site report excellent performance from pumps and power with no trouble whatsoever.

Whether your equipment is to perform on a continuous, intermittent or stand-by basis, you'll want the kind of heavy-duty performance you get from Chrysler *high-speed* industrial engines. From 230 to 331 cubic inch displacement, each Chrysler In-line 6 or V-8 Industrial Engine is engineered, equipped and built for heavy-duty service. Yet each is a *modern* engine, lightweight and small enough to fit practically any construction equipment.

See a Chrysler Industrial Engine Dealer, or write direct to factory. Ask about optional equipment, too.

Dept. 85, Industrial Engine Division, Chrysler Corporation, Trenton, Michigan.

Chrysler Ind. 32 Engine—265 cubic inch displacement



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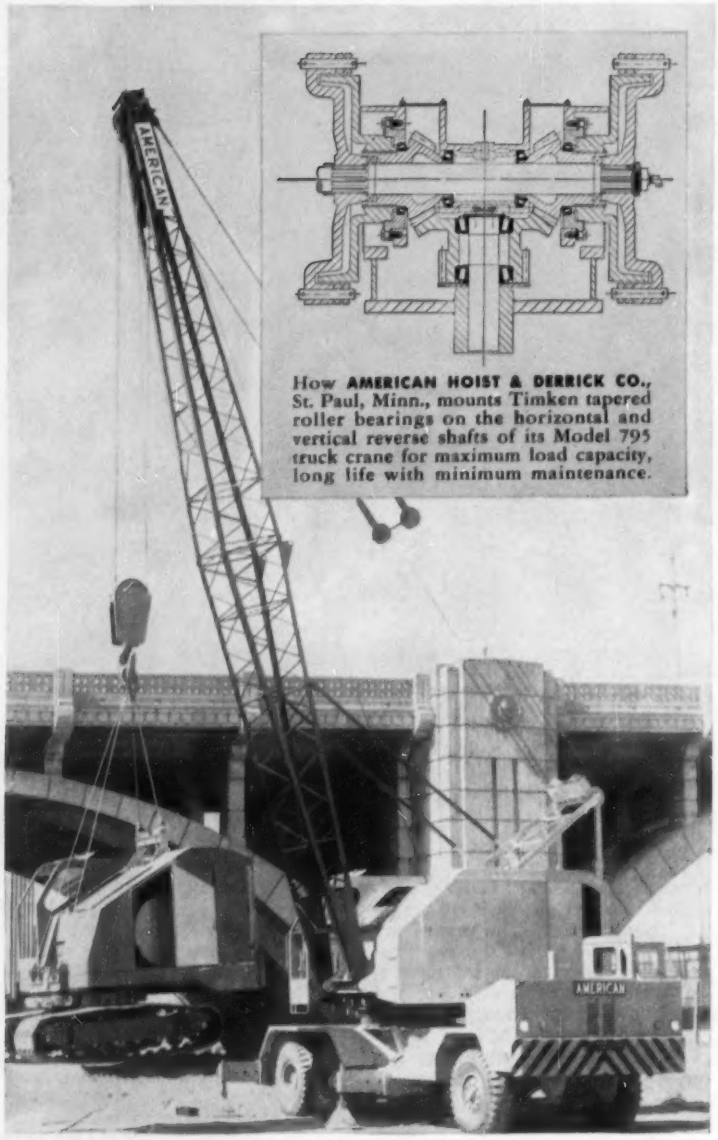
Chrysler

INDUSTRIAL ENGINES

Industrial Engine Division • Chrysler Corporation

TIMKEN® bearings vital in operating truck crane at maximum capacity, lower cost



How **AMERICAN HOIST & DERRICK CO.**, St. Paul, Minn., mounts Timken tapered roller bearings on the horizontal and vertical reverse shafts of its Model 795 truck crane for maximum load capacity, long life with minimum maintenance.

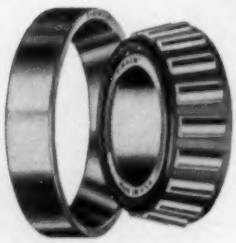
THIS versatile American truck crane handles four tough jobs as crane, shovel, backhoe and dragline. The picture shows an unusual use for this 45-ton crane. Loads on the shafts and gears in the drum assembly are very heavy. And these crane units must operate steadily at maximum capacity with simple, easy maintenance. That's why American Hoist & Derrick Co. uses Timken® tapered roller bearings in vital positions—drum shaft, horizontal slewing shaft reverse gears, vertical slewing shaft, retract shaft gear hub, retract shaft intermediate gear, and independent travel vertical drive shaft.

Because of their tapered construction, Timken bearings take *both* radial and thrust loads in any combination. And full line contact between rollers and races provides extra load-carrying capacity. Shafts are held in rigid alignment. Gear mesh is smooth and accurate—wear is reduced to a minimum.

To take the shock loads often encountered, rollers and races of Timken bearings are case-carburized to get hard, wear-resistant surfaces over tough, shock-resistant cores. And true rolling motion makes Timken bearings practically friction-free. As a result Timken bearings provide long bearing life with minimum maintenance wherever wheels and shafts turn.

To assure finest bearing quality, we make our own fine alloy bearing steel—America's only bearing manufacturer that does. To be sure you get the *most* for your money, specify Timken bearings when you design, build or buy machines. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



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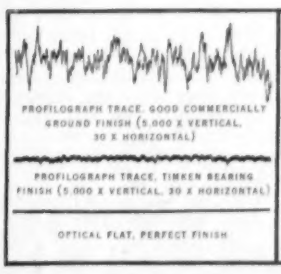
TAPERED ROLLER BEARINGS


PROFILOGRAPH TRACE, GOOD COMMERCIALLY GROUND FINISH (5,000 X VERTICAL, 30 X HORIZONTAL)
PROFILOGRAPH TRACE, TIMKEN BEARING FINISH (5,000 X VERTICAL, 30 X HORIZONTAL)
OPTICAL FLAT, PERFECT FINISH

SMOOTH TO MILLIONTHS OF AN INCH

Surface finish of high quality Timken bearing rollers and races is so smooth that it takes a profilograph to measure its smoothness. This instrument measures surface variations to a millionth of an inch, as shown at the left.

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◐ AND THRUST ⊣◐⊢ LOADS OR ANY COMBINATION ✳